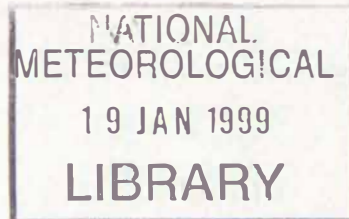


DUPLICATE ALSO



**UK METEOROLOGICAL OFFICE
GLOBAL DATA MONITORING REPORT**

December 1998

**Data Assimilation
Meteorological Office
London Rd
Bracknell
Berkshire
RG12 2SZ**

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis. The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At RSMC Bracknell, for synoptic stations at or below a height of 500 metres, reported mean sea-level pressure is used in the statistics. If this is unavailable the mean sea-level pressure is calculated from the reported station-level pressure and temperature.

For synoptic stations above 500 metres, the mean sea-level pressure is calculated from the reported station-level pressure and temperature, or, if these are not available the height of a standard pressure-level (e.g.: 850 hPa or 700 hPa). If neither of these are available, the reported mean sea-level pressure is used.

Some stations vary their reporting practice according to the observation hour (e.g.: some stations in the CIS report both mean sea-level and station-level pressure at 00 & 12 UTC, but only mean sea-level pressure at 06 & 18 UTC). For monitoring purposes, reported mean sea-level pressure is stored separately from that calculated from station-level pressure

or height of a standard pressure-level. Only statistics for the preferred method (see above) are presented in this report, and so for certain high-level stations, such as those from the CIS, approximately half of the number of observations actually received will appear in the statistics.

Aircraft observations

TABLE 4 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of aircraft reports (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of $>60 \text{ m s}^{-1}$ have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5 , then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) in the layer 70-500 hPa. Observations with a vector wind difference $> 60 \text{ m s}^{-1}$ have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure Parameter

- | | |
|---|---|
| 4 | Mean wind vectors |
| 5 | Mean observation - background wind vector |
| 6 | Mean observation-background speed (m s^{-1}) |
| 7 | RMS observation-background vector (m s^{-1}) |

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5 , then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-27 show satellite mean observation-background temperature differences for NOAA-11 soundings at 500 km resolution and figures 28-30 show the same statistics for NOAA-14. Data are plotted where there are > 30 observations in a 10 degree lat/long box.

N.B. 500 km SATEMs are no longer assimilated into the UKMO global Unified Model. Both 500 km and 120 km SATEMs were replaced on 16th April 1996 by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS (from NOAA-11 and NOAA-14).

Figure	Layer (hPa)
25/28	850-1000
26/29	100-300
27/30	30-50

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

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Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
6. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
7. January 1998. Increase in resolution of UKMO global forecast model.
8. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
9. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
10. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
11. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
12. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).

TABLE 1

**MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: December 1998**

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for ships, fixed buoys and platforms.
Standard of comparison	:Background field from Bracknell global model.
Observation times	:00, 06, 12, 18 UTC
Elements monitored	:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (Degrees).

Parameters monitored

:NOBS	:Number of observations received excluding duplicates.
:NGE	:Number of observations with gross errors.
:PGE	:Percentage of observations with gross errors.
:SD	:SD of difference of observations from background values excluding those with gross errors.
:BIAS	:Mean difference of observations from background values excluding those with gross errors. N.B. a positive bias indicates the observation is veered to the background.
:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA	:NOBS	≥ 20 , and one or more of the following:
	1. bias	≥ 4 hPa (pressure), $\geq 5 \text{ m s}^{-1}$ (wind speed), ≥ 30 degrees (direction).
	2. SD	≥ 6 hPa (pressure), ≥ 80 degrees (direction).
	3. PGE	≥ 25

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed $> 5 \text{ m s}^{-1}$

IDENTIFIER	HR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
CTHI	ALL	P	SUR	32	25	78	1.2	-11.7	11.8
CYLX	ALL	P	SUR	26	14	54	0.6	-13.4	13.4
ELTX5	ALL	P	SUR	30	0	0	1.2	6.3	6.4
ELVY8	ALL	P	SUR	31	0	0	1.3	-4.1	4.3
PCCZ	ALL	P	SUR	45	0	0	1.3	5.0	5.1
PEXX	ALL	P	SUR	30	0	0	1.6	-4.4	4.7
PFSK	ALL	P	SUR	31	0	0	1.0	-4.6	4.7
P3YR5	ALL	P	SUR	22	0	0	2.0	4.3	4.8
UCJM	ALL	P	SUR	28	15	54	4.5	1.4	4.7
UCMR	ALL	P	SUR	31	15	48	6.1	1.6	6.3
UDTH	ALL	P	SUR	26	0	0	1.4	-4.5	4.7
UDYO	ALL	P	SUR	28	10	36	1.9	-0.6	2.0
UFJJ	ALL	P	SUR	27	1	4	2.8	-6.1	6.7
UIAG	ALL	P	SUR	39	6	15	3.5	-10.9	11.4
WCV7620	ALL	P	SUR	33	0	0	1.5	4.8	5.0
WDZB	ALL	P	SUR	40	0	0	1.5	-6.2	6.4
WDZG	ALL	P	SUR	34	1	3	2.0	-4.2	4.7
WQZ9670	ALL	P	SUR	107	0	0	2.4	-6.2	6.6
3FGN3	ALL	P	SUR	22	1	5	1.8	-7.0	7.2
3FGQ3	ALL	P	SUR	52	0	0	1.0	8.2	8.3
3FOW4	ALL	P	SUR	34	0	0	1.1	4.9	5.0
3FPB6	ALL	P	SUR	21	0	0	0.8	-4.6	4.7
31497	ALL	P	SUR	119	119	100	0.0	0.0	0.0
WIND SPEED									
A9DG	ALL	SPEED	SUR	67	0	0	6.5	7.5	10.0
C6KB2	ALL	SPEED	SUR	24	0	0	3.6	-5.3	6.4
C6KF8	ALL	SPEED	SUR	99	1	1	4.2	6.3	7.6
C6LQ3	ALL	SPEED	SUR	40	3	7	5.8	13.5	14.7
DATG	ALL	SPEED	SUR	51	0	0	4.7	7.8	9.1
DGOL	ALL	SPEED	SUR	36	0	0	5.9	6.6	8.8
DSUR	ALL	SPEED	SUR	20	0	0	5.9	5.8	8.3
DXQC	ALL	SPEED	SUR	51	1	2	4.0	5.6	6.9
EIBW	ALL	SPEED	SUR	24	0	0	2.8	5.1	5.8
ELJH9	ALL	SPEED	SUR	45	0	0	3.8	5.1	6.4
ELNK8	ALL	SPEED	SUR	45	1	2	3.8	7.6	8.5
FNHV	ALL	SPEED	SUR	20	0	0	3.9	5.2	6.5
GFWX	ALL	SPEED	SUR	59	0	0	6.8	6.6	9.5
JPBY	ALL	SPEED	SUR	42	0	0	7.2	6.8	9.9
LAVV4	ALL	SPEED	SUR	24	0	0	4.4	8.2	9.3
OUEK	ALL	SPEED	SUR	30	5	17	6.0	12.8	14.1
OYCZ	ALL	SPEED	SUR	27	13	48	11.4	10.1	15.2
PCCZ	ALL	SPEED	SUR	71	0	0	6.3	7.1	9.5
PJED	ALL	SPEED	SUR	76	0	0	6.1	6.8	9.2
PJOX	ALL	SPEED	SUR	37	3	8	7.3	8.5	11.2
SYMK	ALL	SPEED	SUR	35	0	0	2.3	5.7	6.2
S6DH	ALL	SPEED	SUR	27	0	0	5.2	7.3	9.0
UCNN	ALL	SPEED	SUR	37	0	0	14.7	5.5	15.7
3FQT4	ALL	SPEED	SUR	22	0	0	9.0	6.3	11.0
44145	ALL	SPEED	SUR	253	1	0	4.4	5.7	7.2
63113	ALL	SPEED	SUR	490	0	0	7.1	-5.4	9.0
64045	ALL	SPEED	SUR	1006	0	0	5.2	-6.0	7.9
9HIG4	ALL	SPEED	SUR	32	1	3	6.1	5.8	8.4
9MBQ4	ALL	SPEED	SUR	59	0	0	3.9	5.9	7.1
9MUG	ALL	SPEED	SUR	61	5	8	6.5	10.4	12.2
9VVU	ALL	SPEED	SUR	36	0	0	2.7	-5.1	5.8

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
WIND DIRECTION									
DICP	ALL	DIRN.	SUR	258	64	25	86.4	16.7	88.0
ELOX9	ALL	DIRN.	SUR	20	0	0	45.4	58.3	73.9
FZOP	ALL	DIRN.	SUR	25	0	0	89.4	15.2	90.7
UCMR	ALL	DIRN.	SUR	27	0	0	80.5	-25.0	84.3
UIAG	ALL	DIRN.	SUR	26	0	0	114.0	35.0	119.3
46053	ALL	DIRN.	SUR	34	0	0	17.8	-34.2	38.5
46181	ALL	DIRN.	SUR	197	0	0	32.6	-34.1	47.2

AVAILABILITY - SHIP/SYNOP - DECEMBER 1998

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 20002

FIGURE 1

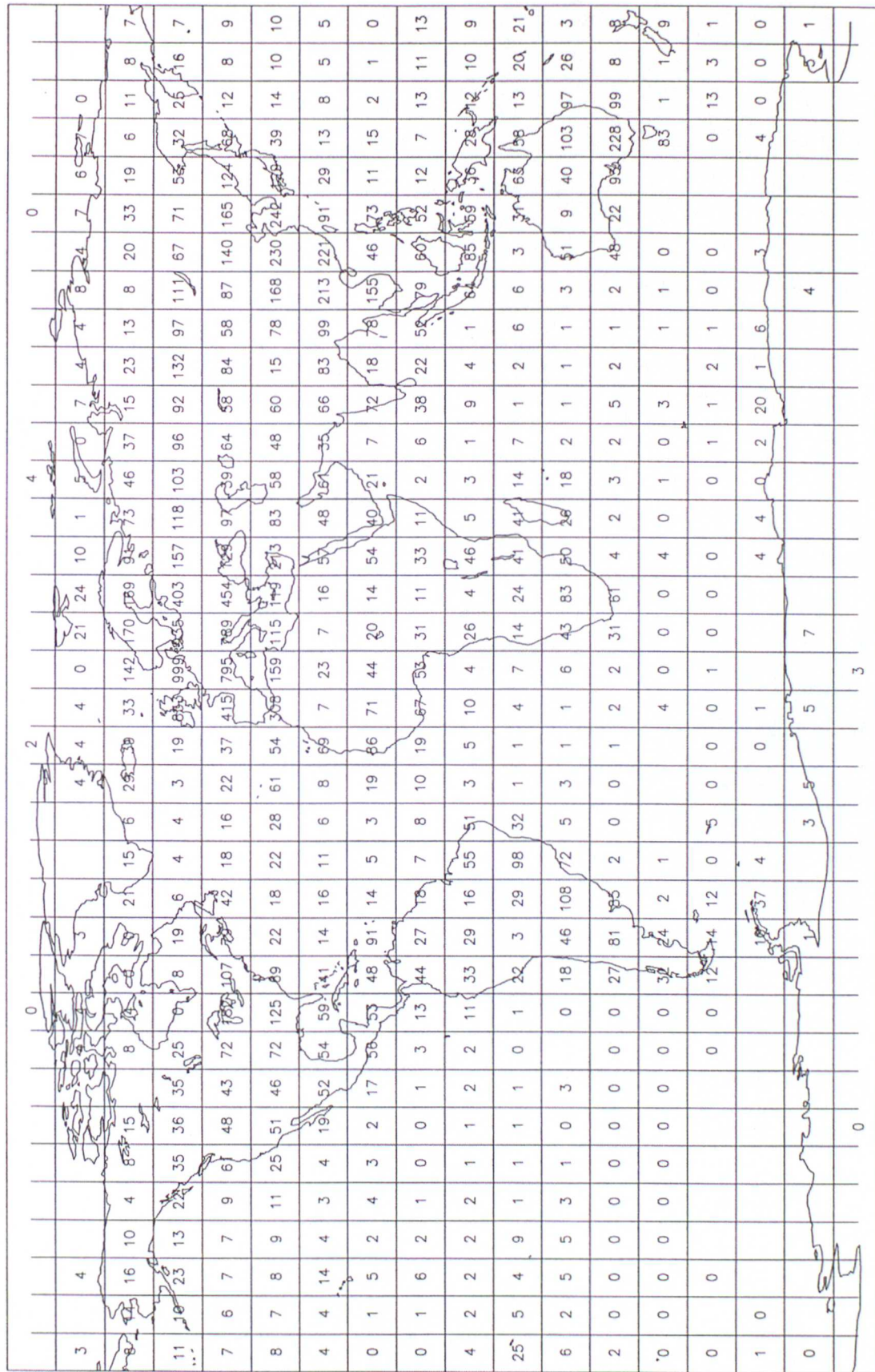


TABLE 2

**MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: December 1998**

Monitoring procedures

Period	:One calendar month.	
Data monitored	:Reports from each unique identifier for drifting buoys.	
Standard of comparison	:Background field from Bracknell global model.	
Position	:Average latitude and longitude for period.	
Observation times	:00, 06, 12, 18 UTC	
Elements monitored	:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (degrees).	
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. N.B. a positive bias indicates the observation is veered to the background.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa :25 m s^{-1}	(pressure) (vector wind)
SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:
	1. bias	≥ 4 hPa (pressure), ≥ 5 m s^{-1} (wind speed), ≥ 30 degrees (direction).
	2.SD	≥ 6 hPa (pressure), ≥ 80 degrees (direction).
	3.PGE	≥ 25 .

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed $> 5 \text{ m s}^{-1}$

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
------------	------	-------	------	------	-------	------	-----	-----	----	------	-----

MEAN SEA LEVEL PRESSURE

29746	35.0	-137.4	ALL	P	SUR	164	9	5	3.2	8.0	8.6
31948	-12.1	-36.4	ALL	P	SUR	114	114	100	0.0	0.0	0.0
33538	-45.8	-53.9	ALL	P	SUR	420	24	6	4.2	4.8	6.4
46767	50.4	-134.6	ALL	P	SUR	262	64	24	3.5	9.1	9.8
46768	54.1	-155.2	ALL	P	SUR	403	25	6	3.9	4.4	5.8
46907	53.3	-155.3	ALL	P	SUR	244	6	2	3.2	5.5	6.3
62517	48.9	-15.9	ALL	P	SUR	436	53	12	3.9	5.5	6.7
62518	43.3	-15.5	ALL	P	SUR	187	187	100	0.0	0.0	0.0
64563	62.2	-10.6	ALL	P	SUR	91	45	49	1.9	-2.0	2.7

WIND SPEED

21531	37.2	-164.3	ALL	SPEED	SUR	488	0	0	3.0	-7.1	7.7
41626	24.6	-75.6	ALL	SPEED	SUR	26	0	0	0.8	-8.8	8.8

WIND DIRECTION

44601	52.3	-39.8	ALL	DIRN.	SUR	426	12	3	48.8	-43.2	65.1
46535	37.5	-132.4	ALL	DIRN.	SUR	462	0	0	79.2	36.6	87.3
46560	40.7	-133.5	ALL	DIRN.	SUR	507	0	0	37.6	-83.2	91.3
52540	13.4	144.7	ALL	DIRN.	SUR	176	0	0	18.6	88.4	90.3
55587	-41.5	163.3	ALL	DIRN.	SUR	374	0	0	26.3	42.2	49.7

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 5034

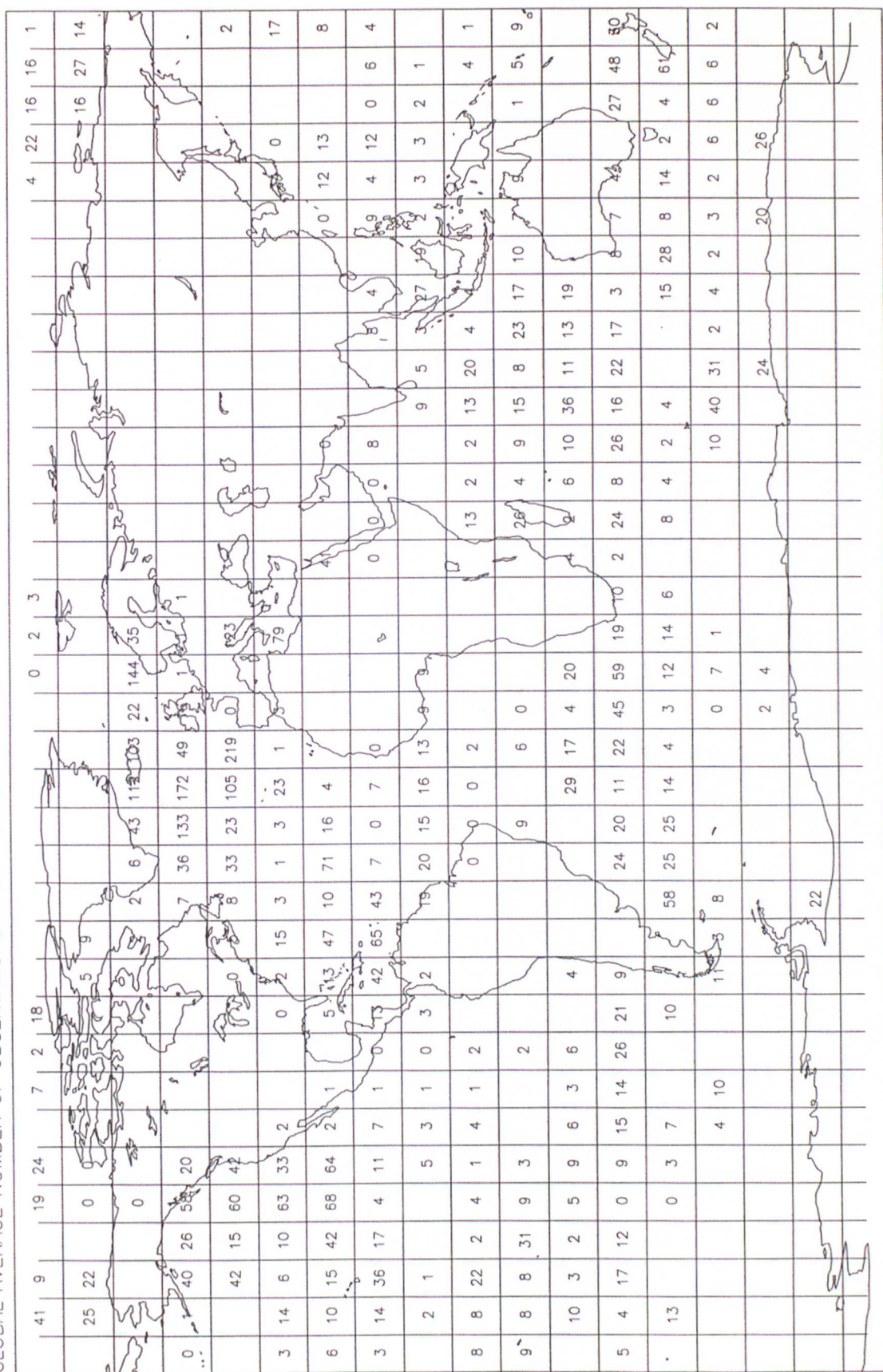


TABLE 3

**MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: December 1998**

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from Bracknell global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Mean sea level pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1. bias	≥ 4 hPa
	2. SD	≥ 6 hPa
	3. PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT (M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60445	36.2N	5.4E	1081	S8	109	1	1	0	0.8	4.7	4.8
60468	35.6N	6.2E	1052	S8	82	82	100	0	0.0	0.0	0.0
60511	35.3N	1.4E	1127	S8	106	88	83	0	0.3	14.5	14.5
60535	34.7N	3.3E	1144	S8	81	0	0	0	0.9	-6.4	6.5
60571	31.6N	2.2W	773	S8	109	0	0	0	0.8	-4.2	4.3
60670	24.6N	9.5E	1054	S8	99	1	1	1	0.9	9.3	9.3
63330	13.5N	39.5E	2070	MS	53	53	100	0	0.0	0.0	0.0
63334	10.3N	37.7E	2515	MS	73	0	0	0	0.7	10.5	10.5
63402	7.7N	36.8E	1725	MS	70	0	0	0	1.0	7.9	8.0
63450	9.0N	38.8E	2354	MS	99	0	0	0	0.6	5.5	5.5
63471	9.6N	41.9E	1260	MS	84	2	2	0	0.8	11.3	11.3
63478	5.9N	43.6E	295	MS	54	0	0	0	1.0	6.5	6.6
67295	19.1S	33.5E	731	S8	24	2	8	92	0.8	5.9	6.0
68343	27.6S	25.6E	1228	S8	110	0	0	100	1.1	-8.7	8.8
68396	26.5S	31.3E	641	S8	50	0	0	0	1.0	4.4	4.5
69679	43.9N	18.3E	1557	MS	42	42	100	0	0.0	0.0	0.0

WMO REGION 2:

STATION	LAT	LONG	HT (M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
23383	66.9N	93.5E	278	MS	111	0	0	41	3.3	5.2	6.2
24382	66.4N	143.2E	196	MS	62	1	2	15	2.9	5.0	5.8
24671	63.9N	135.9E	402	MS	118	15	13	55	2.0	11.4	11.6
24688	63.3N	143.2E	741	MS	117	38	32	44	4.6	4.8	6.6
30253	57.9N	114.2E	275	MS	119	3	3	21	4.3	4.8	6.4
30320	56.9N	105.7E	669	MS	116	58	50	0	1.9	1.5	2.4
30554	54.5N	113.6E	995	MS	119	0	0	48	3.5	6.8	7.6
30664	53.5N	115.6E	811	MS	29	0	0	0	1.3	-4.4	4.6
31123	57.8N	130.9E	255	MS	57	1	2	47	3.8	5.9	7.0
31137	56.3N	131.1E	850	MS	116	17	15	20	5.3	4.2	6.8
31474	51.6N	133.3E	384	MS	117	1	1	41	3.3	7.5	8.2
31532	50.9N	132.3E	272	MS	117	0	0	47	2.5	6.0	6.5
40743	36.2N	57.7E	941	MS	109	0	0	0	1.1	-4.7	4.8
40762	35.3N	59.2E	1333	M	109	1	1	0	1.0	-12.8	12.8
41254	23.1N	57.7E	1755	S8	57	57	100	0	0.0	0.0	0.0
41535	34.2N	73.3E	1308	8	42	1	2	7	2.3	-6.5	6.9
44212	50.0N	92.1E	940	MS	112	3	3	20	2.1	4.7	5.1
44239	48.8N	103.6E	1209	MS	100	0	0	0	1.3	-4.9	5.1
44256	49.6N	114.4E	706	MS	82	0	0	5	2.2	-4.6	5.1
44416	28.6N	81.6E	720	MS	64	3	5	2	1.6	5.0	5.2
44477	27.0N	87.4E	1445	S8	70	69	99	0	0.0	-4.4	4.4
47020	41.0N	126.6E	305	M	118	0	0	1	2.1	4.3	4.8
47022	40.8N	128.2E	1200	S	57	0	0	4	1.2	4.0	4.2
51288	45.4N	90.5E	1651	S	119	0	0	17	1.5	-4.1	4.4
51334	44.6N	82.9E	321	M	117	0	0	65	3.1	8.2	8.8
51379	44.0N	89.6E	794	M	118	0	0	38	2.7	7.5	8.0
51495	43.5N	91.6E	874	M	119	0	0	13	2.3	4.8	5.3
51730	40.5N	81.1E	1013	M	119	0	0	0	1.8	4.2	4.6
51818	37.6N	78.3E	1376	M	118	0	0	25	3.0	5.9	6.6
52378	41.4N	102.4E	960	M	119	1	1	9	1.5	4.5	4.7
52602	38.8N	93.4E	2734	S	119	0	0	0	1.4	-6.2	6.4
52866	36.6N	101.8E	2262	S	118	0	0	0	0.9	-5.6	5.7
53083	44.6N	114.2E	1183	M	118	0	0	88	2.3	7.7	8.0
53352	41.7N	110.4E	1377	M	119	0	0	66	2.2	6.5	6.9
53480	41.0N	113.1E	1416	M	118	0	0	45	2.3	5.7	6.1
53487	40.1N	113.3E	1069	M	118	0	0	9	2.0	4.5	4.9
53502	39.8N	105.8E	1033	M	119	1	1	36	1.6	4.0	4.3
53588	39.0N	113.5E	2898	S	117	117	100	0	0.0	0.0	0.0
53593	39.8N	114.6E	910	M	119	0	0	30	1.7	4.4	4.7
54115	43.6N	118.1E	800	M	119	0	0	3	2.1	4.2	4.7

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
54308	41.2N	116.6E	661	M	118	0	0	1	1.8	5.0	5.3
54311	41.9N	117.8E	844	M	119	0	0	3	2.0	5.5	5.9
54386	41.4N	128.2E	1018	M	118	1	1	15	3.2	6.4	7.2
54423	41.0N	117.9E	374	MS	119	0	0	0	1.4	4.1	4.3
54587	39.1N	123.2E	-103	M	103	1	1	3	1.8	-4.5	4.8
54826	36.3N	117.1E	1536	S	118	0	0	37	2.0	-4.3	4.7
56021	34.1N	95.8E	4176	S	119	0	0	0	0.8	-5.7	5.8
56144	31.8N	98.6E	3184	S	75	0	0	0	1.4	-7.6	7.7
56385	29.5N	103.3E	3049	S	118	1	1	3	1.7	-8.4	8.6
56444	28.5N	98.9E	3488	S	116	53	46	28	0.7	13.5	13.5
56462	29.0N	101.5E	2994	S	119	0	0	0	1.5	7.7	7.8
56954	22.6N	99.9E	1054	M	119	0	0	5	1.7	4.4	4.7
58437	30.1N	118.2E	1836	S	118	0	0	41	1.8	-4.1	4.5

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	45	0	0	0	1.3	-6.0	6.1
82326	3.8S	62.1W	48	MS	72	0	0	1	2.1	4.1	4.6
82704	7.6S	72.7W	170	M	68	0	0	0	1.6	-4.6	4.9
83214	10.3S	54.9W	285	MS	46	0	0	4	2.3	-5.8	6.2
83235	12.4S	46.4W	604	MS	76	0	0	0	1.0	6.0	6.1
83319	14.7S	52.4W	315	MS	46	0	0	2	1.3	-4.9	5.1
83332	14.1S	46.4W	826	M	78	2	3	1	1.7	12.7	12.8
83408	14.3S	43.8W	447	S	69	0	0	0	0.9	10.2	10.2
83423	16.7S	49.3W	741	MS	77	2	3	0	0.8	-6.0	6.1
83488	17.8S	42.9W	1097	MS	74	74	100	0	0.0	0.0	0.0
83531	18.6S	46.5W	940	MS	73	1	1	1	1.2	-6.8	6.9
83587	19.9S	43.9W	850	MS	77	0	0	1	1.0	-7.0	7.1
83773	23.1S	48.9W	793	S	38	0	0	0	1.2	-6.2	6.3
83836	25.5S	50.6W	837	MS	76	1	1	59	1.1	-4.0	4.1
84401	5.2S	80.6W	49	MS	92	0	0	0	1.4	5.1	5.3
84455	6.5S	76.4W	281	MS	59	0	0	0	1.3	4.1	4.3
84472	7.1S	78.5W	2620	S	40	0	0	0	0.7	-6.6	6.6
84686	13.6S	72.0W	3248	S	89	0	0	0	1.0	-8.1	8.2
84735	15.5S	70.2W	3826	S	58	0	0	0	1.1	-5.6	5.7
84782	18.1S	70.3W	468	MS	85	0	0	0	1.4	6.8	6.9
85406	18.3S	70.3W	55	M	114	0	0	0	1.2	4.4	4.6
85836	43.6S	71.8W	277	M	36	0	0	28	2.1	4.3	4.8

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
70267	64.0N	145.7W	391	S	96	5	5	10	2.8	5.1	5.8
70271	62.2N	145.5W	481	MS	88	6	7	48	3.2	6.6	7.3
72376	36.8N	108.2W	1677	M	119	0	0	28	3.3	5.0	6.0
72475	38.4N	113.0W	1536	M	100	0	0	51	3.6	6.6	7.5
76113	30.7N	111.7W	419	MS	72	0	0	33	2.3	4.2	4.8
76118	30.4N	109.7W	1040	MS	35	0	0	0	1.1	-10.9	11.0
76491	23.8N	99.1W	355	MS	72	0	0	26	1.3	4.3	4.5
76632	20.1N	98.7W	2417	MS	34	0	0	0	0.7	-5.9	5.9
76658	19.2N	103.7W	494	MS	28	0	0	0	0.9	7.1	7.2
76698	19.6N	88.0W	20	MS	84	0	0	1	1.5	-4.6	4.8
76750	18.5N	88.3W	9	MS	86	0	0	55	2.4	-7.0	7.4
76775	17.1N	96.7W	1550	MS	49	1	2	0	1.0	4.7	4.8
76845	16.7N	92.6W	2276	MS	42	42	100	0	0.0	0.0	0.0
78718	14.4N	87.6W	626	MS	66	42	64	0	0.7	-13.7	13.7

WMO REGION 5:

STATION	LAT	LONG	HT (M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
91163	21.9N	159.6W	7	8	296	296	100	0	0.0	0.0	0.0
94328	22.4S	133.6E	623	MS	40	0	0	0	0.7	5.9	5.9
94955	41.6S	145.7E	684	MS	113	113	100	0	0.0	0.0	0.0
95952	41.9S	145.6E	560	MS	114	114	100	0	0.0	0.0	0.0

WMO REGION 6:

STATION	LAT	LONG	HT (M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
02045	67.8N	20.4E	408	M	40	40	100	0	0.0	0.0	0.0
04207	81.7N	59.9W	105	MS	94	0	0	2	1.5	-4.2	4.5
06672	46.9N	8.6E	449	MS	356	0	0	14	2.4	4.4	5.0
06712	46.3N	6.9E	381	MS	356	0	0	2	2.1	4.4	4.9
06720	46.2N	7.3E	482	MS	356	0	0	10	3.0	4.6	5.5
06760	46.2N	8.8E	366	MS	356	0	0	2	2.5	4.5	5.1
06762	46.2N	8.9E	197	MS	356	0	0	1	2.5	4.6	5.2
06770	46.0N	9.0E	273	MS	356	0	0	1	2.2	4.2	4.7
06990	47.1N	9.5E	460	MS	356	0	0	1	2.3	4.0	4.6
11130	47.6N	12.2E	495	MS	118	0	0	6	1.5	4.0	4.3
11146	47.1N	13.0E	3105	S7	83	0	0	33	2.1	-4.9	5.3
11180	47.7N	15.8E	1546	S8	109	1	1	10	1.5	-4.8	5.0
11213	46.6N	13.9E	495	MS	110	0	0	38	2.3	4.8	5.3
11231	46.6N	14.3E	448	MS	113	0	0	6	2.1	4.5	5.0
11343	47.1N	13.0E	3105	S	116	2	2	55	1.8	-4.3	4.7
11930	49.2N	20.2E	2633	S7	119	0	0	30	1.6	-4.3	4.6
12510	50.7N	15.7E	1603	S8	114	0	0	58	2.2	-5.4	5.8
13289	44.1N	21.9E	1037	8	117	1	1	74	2.2	-5.2	5.6
13369	43.3N	20.0E	1038	8	114	0	0	82	2.3	-4.1	4.7
13370	43.8N	20.0E	310	MS	85	0	0	9	2.0	4.1	4.6
13376	43.7N	20.7E	215	MS	116	0	0	7	1.7	4.1	4.4
13473	42.7N	20.3E	498	MS	98	1	1	18	2.8	4.4	5.2
13489	42.6N	21.9E	433	MS	117	0	0	0	2.0	4.2	4.7
13586	42.0N	21.6E	238	MS	115	0	0	4	2.4	4.8	5.4
15145	46.5N	24.5E	308	MS	119	0	0	2	2.1	4.3	4.8
15235	45.9N	25.0E	428	MS	119	0	0	2	2.6	4.4	5.1
15260	45.8N	24.1E	443	MS	119	0	0	0	2.5	4.6	5.2
15280	45.4N	25.4E	2504	S7	112	1	1	54	1.9	-4.2	4.6
16614	40.4N	21.3E	604	MS	84	0	0	0	1.2	-6.0	6.1
17092	39.8N	39.5E	1218	S8	119	0	0	0	1.3	8.8	8.9
17203	38.9N	40.5E	1177	S8	108	0	0	0	1.1	4.8	4.9

ANTARCTIC:

STATION	LAT	LONG	HT (M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89264	71.4S	68.9W	780	S	127	0	0	0	2.0	7.1	7.4
89345	81.7S	148.8W	620	S	362	22	6	13	3.5	-8.0	8.7

TABLE 4

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: December 1998

Monitoring procedures

Period	:One calendar month.
Data monitored	:Statistics for each airline carrier.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from Bracknell global model.
Observation times	:All hours combined.
Level(s) monitored	:70.0 - 500.0 hPa
Elements monitored	:TEMP in °C ; WIND in m s ⁻¹
Parameters monitored	
:N REP.	:Number of observations received excluding duplicates.
:PG	:Percentage of observations with gross errors.
:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
:PC	:Percentage of observations with calm winds.
:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s ⁻¹ Vector Wind
SELECTION CRITERIA	:N REP ≥ 20

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				
		PG	PR	RMS	BIAS		PG	PR	PC	RMS	BIAS
AAA	113	0	19	1.4	0.5	111	0	20	0	7.8	0.6
AAH	62	3	23	1.8	-0.1	63	0	22	0	8.5	2.8
AAL	5240	0	15	1.6	0.0	5230	0	16	0	9.2	1.0
AAR	1226	0	7	1.9	-0.5	1223	0	7	0	8.9	0.5
ACA	1531	0	3	1.8	-0.2	1539	0	4	0	7.8	0.7
ACI	74	1	36	1.8	-0.1	72	0	33	0	8.0	1.8
AEA	433	1	9	2.0	0.9	431	0	10	0	9.7	0.3
AEL	982	1	15	1.9	-0.5	984	0	15	0	8.6	0.8
AEY	182	0	4	1.7	0.4	181	0	4	0	9.3	0.1
AFL	406	1	5	2.2	0.8	405	0	4	0	7.8	1.0
AFR	2154	1	11	1.9	0.2	2183	0	11	0	9.2	0.8
AIH	176	1	6	1.9	0.5	176	0	4	0	7.9	1.4
AJM	137	1	3	1.7	-0.5	137	1	7	0	10.5	0.5
AMM	104	2	8	1.6	0.2	103	0	5	0	9.1	0.7
AMT	688	1	40	2.0	0.7	682	0	40	0	8.5	1.1
AMX	356	2	5	1.9	-0.2	358	1	6	0	11.2	0.5
ANA	1574	0	5	1.8	-0.2	1576	0	6	0	8.7	0.8
ANZ	3664	1	42	1.8	-0.1	3614	0	42	0	8.5	1.0
AOM	871	1	6	1.7	0.8	882	0	5	0	8.5	0.8
ARG	52	2	2	2.0	0.6	53	0	8	0	13.5	2.0
ATN	173	0	40	1.9	-0.6	173	0	39	0	6.8	1.2
AVA	442	1	5	1.6	0.0	449	0	6	0	10.1	1.0
AVE	34	6	21	2.3	0.5	34	0	18	0	12.8	1.0
AVN	87	0	1	1.2	0.3	88	0	2	0	8.1	0.5
AXA	75	0	45	1.5	0.3	75	0	45	0	8.0	1.4
AZA	335	1	100	2.3	0.0	342	0	8	0	10.0	0.6
BAL	614	0	11	1.8	-0.5	622	0	13	0	9.6	1.1
BAW	1557	1	11	2.1	-0.1	1587	0	11	0	8.9	0.9
BBB	45	0	4	1.9	-0.6	44	0	5	0	9.4	1.5
BLX	76	3	5	2.0	-0.3	78	0	4	0	11.8	0.4
BWA	372	1	3	2.4	1.9	374	0	4	0	9.1	1.3
CAL	1544	0	6	1.8	-0.1	1550	0	8	0	9.3	0.7
CCA	287	3	14	2.6	0.3	309	1	100	0	14.8	-0.5
CDN	2136	0	9	2.0	0.2	2127	0	10	0	9.3	1.2
CES	307	0	7	2.2	0.1	314	1	8	0	8.9	0.9
CFC	36	0	14	1.6	0.3	37	0	19	0	13.0	1.0
CFG	1148	1	4	1.8	-0.6	1142	0	4	0	8.4	0.3
CKS	706	1	42	1.6	0.5	695	0	43	0	8.2	1.6
CKT	227	0	7	1.9	0.8	226	0	9	0	9.3	0.8
CLX	354	1	3	1.7	-0.5	353	1	4	0	9.0	0.5
CMI	450	1	7	2.0	0.8	457	0	7	0	9.0	1.3
CMM	408	1	15	2.0	-0.4	404	0	15	0	10.2	1.5
COA	1573	1	24	1.6	0.2	1585	0	27	0	11.2	2.0
CPA	73	1	11	1.5	-0.3	78	3	14	0	8.8	1.4
CRL	682	1	5	1.7	0.3	676	0	6	0	8.3	1.1
CSN	80	5	11	2.0	0.7	82	0	16	0	11.8	-0.5
CTB	230	1	4	1.7	-0.6	233	0	4	0	8.2	-0.2
CUB	505	1	7	2.1	0.9	505	1	9	0	11.0	0.2
DAL	4243	1	29	1.9	0.5	4256	0	29	0	8.5	0.9
DBY	688	1	2	1.6	-0.6	688	0	3	0	8.8	0.3
DLH	2490	0	9	1.9	0.0	2473	0	10	0	8.3	1.3
EIA	263	3	35	1.4	0.5	259	0	35	0	8.5	0.3
ELY	125	0	7	1.8	0.0	129	0	9	0	9.2	2.2
EVA	2320	0	7	1.8	-0.3	2356	0	8	0	8.7	0.3
EWV	85	1	1	1.8	0.7	84	0	4	0	8.6	0.9
FDX	1489	0	16	1.7	0.4	1505	0	16	0	9.3	0.9
FIN	464	0	5	1.8	0.1	454	0	7	0	8.6	0.7
FJI	1033	4	40	1.7	0.5	995	0	38	0	8.3	1.5

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				
		PG	PR	RMS	BIAS		PG	PR	PC	RMS	BIAS
FOM	239	3	41	1.4	-0.1	234	1	39	0	7.5	1.0
GHA	87	5	7	1.5	-0.5	87	0	5	0	10.7	1.8
GIA	71	0	25	1.4	0.7	69	1	29	0	8.9	1.4
GTI	128	0	8	1.8	0.3	132	1	9	0	8.2	0.4
HAL	3039	0	34	1.5	0.2	3012	0	35	0	9.9	1.0
HBI	22	0	27	1.6	-0.6	23	0	26	0	5.2	1.0
HLF	73	0	4	1.7	-0.7	75	0	7	0	12.1	-0.4
HLQ	27	0	19	1.2	0.9	26	0	15	0	6.6	1.3
HRH	156	5	56	1.6	0.3	149	0	55	0	10.8	2.2
IBE	2504	1	14	1.8	0.6	2493	0	15	0	9.8	0.4
ICE	833	0	2	1.6	0.2	810	0	3	0	7.5	0.5
JAL	6629	0	4	1.8	0.1	6633	0	5	0	8.7	0.9
JAZ	29	0	0	1.7	1.3	29	0	0	0	6.4	1.2
JKK	203	1	12	1.6	-0.2	200	1	12	0	10.4	0.5
KAL	3489	1	9	1.9	-0.4	3486	0	10	0	9.7	0.8
KIW	21	5	38	1.7	0.8	20	0	35	0	8.9	5.3
KLM	2896	0	11	1.8	0.1	2887	0	12	0	8.6	0.7
LAN	47	4	15	3.4	0.6	44	0	7	0	11.7	2.6
LAP	27	4	7	3.0	2.2	26	0	100	0	11.6	3.6
LDA	166	1	11	1.7	0.1	173	0	13	0	8.3	0.7
LDI	610	5	100	2.0	-0.9	613	0	16	0	9.6	-0.1
LIB	358	1	5	1.8	1.0	358	1	5	0	9.1	1.3
LOT	127	0	4	2.3	-1.3	125	0	6	0	10.7	-0.3
LPR	24	0	17	2.5	-0.3	24	0	21	0	14.1	-1.3
LTU	697	0	3	1.7	-0.6	705	0	5	0	9.4	1.2
MAS	336	0	9	1.8	-0.2	360	1	11	0	10.1	1.0
MDA	112	3	4	1.9	0.2	111	0	5	0	10.2	-1.2
MON	30	0	7	1.4	0.8	30	0	10	0	9.0	1.7
MPD	224	1	5	1.9	0.2	222	0	5	0	10.9	0.2
MPH	834	0	4	1.8	-0.4	834	1	5	0	8.4	0.9
NCA	597	0	3	1.8	0.1	596	0	4	0	9.1	0.8
NWA	9875	1	10	1.9	0.5	9909	0	11	0	8.6	0.6
PAC	207	1	26	1.6	0.2	203	0	28	0	8.4	1.6
PAL	822	1	10	1.7	-0.5	804	0	11	0	8.8	0.8
PAO	408	1	47	1.8	0.2	408	0	45	0	8.9	1.6
PAQ	24	0	8	1.1	0.1	24	0	8	0	9.9	3.2
QFA	1784	1	46	1.8	0.1	1769	0	47	0	8.8	0.8
RAF	115	1	3	1.7	1.1	114	0	4	0	9.5	-0.2
RAM	63	3	6	1.8	-0.8	65	0	8	0	8.4	2.5
RCH	360	1	15	2.0	0.4	343	1	18	0	9.6	1.6
RKA	101	1	6	1.8	-0.5	100	0	6	0	8.3	1.0
ROY	24	0	13	2.1	-0.6	23	0	22	0	14.0	2.8
RRR	48	0	23	2.0	0.8	49	0	20	0	8.5	-1.2
RYN	429	1	42	1.7	0.3	427	0	41	0	8.1	0.3
SAA	301	0	1	1.6	-0.4	303	1	3	0	9.0	0.2
SAB	44	2	2	1.8	-0.1	46	0	0	0	5.4	0.3
SAS	1330	0	1	1.9	-0.1	1319	0	2	0	8.5	0.6
SCX	23	0	43	1.2	0.3	24	0	46	0	10.6	2.0
SIA	1129	1	7	2.0	-0.5	1132	0	8	0	9.2	0.3
SLR	196	2	10	1.6	-0.4	199	0	9	0	8.3	1.0
SOL	65	0	3	1.1	0.3	65	0	3	0	6.5	1.4
SVA	99	0	8	1.8	-0.5	105	1	11	0	10.7	-0.5
SVV	23	9	13	3.4	-2.4	23	0	0	0	9.5	2.1
SWR	91	0	2	1.9	0.4	94	0	4	0	8.3	1.5
TAP	547	1	7	1.8	-0.3	545	1	8	0	10.5	1.4
TCO	21	0	10	2.6	-0.9	21	0	5	0	7.7	1.3
THA	463	1	9	2.0	-0.8	464	0	10	0	9.9	0.2
THT	79	0	23	1.8	1.0	80	0	24	0	9.8	0.5
TOW	98	0	2	1.5	0.0	100	0	6	0	10.2	1.1

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				
		PG	PR	RMS	BIAS		PG	PR	PC	RMS	BIAS
TPA	20	0	0	1.9	0.4	20	0	0	0	8.5	0.4
TSC	26	0	4	1.7	0.5	27	0	4	0	8.0	-0.1
TSO	27	0	4	1.2	-0.3	27	4	4	0	6.8	-0.6
TWA	1226	1	13	1.9	0.5	1226	0	13	0	8.7	1.2
UAL	99533	1	84	1.4	-0.1	99452	0	84	0	6.9	0.6
UPS	1197	0	31	1.7	0.2	1208	0	32	0	9.3	0.7
USA	184	0	3	1.6	-0.1	184	1	6	0	9.8	1.2
VIR	344	1	3	2.1	-0.2	352	0	2	0	8.9	0.6
VKG	69	0	3	1.6	0.3	68	0	1	0	7.6	0.7
VRG	70	6	26	2.7	0.8	69	0	65	0	13.7	1.2
VSP	95	2	4	1.9	0.2	96	2	6	0	10.6	1.1
VVR	70	0	34	2.6	1.0	70	0	34	0	7.8	1.1
WOA	106	0	11	2.2	0.1	109	0	16	0	12.7	-0.1
ZKN	2988	0	1	1.3	0.1	2988	0	1	0	7.0	0.8
AN	21683	0	1	1.2	0.2	21683	0	1	0	6.3	0.9
AR	1560	2	34	2.8	2.5	1560	0	32	0	7.6	1.8
BA	25270	0	4	1.5	0.4	25225	0	1	0	6.7	0.6
IT	441	0	53	1.2	0.3	438	0	56	0	7.1	1.5
KL	8723	0	11	1.5	0.7	8719	0	11	0	6.9	0.9
LH	3255	0	1	1.8	0.9	3300	0	1	0	6.6	1.1
MK	2262	0	0	1.8	1.2	2255	0	0	0	7.7	1.6
QF	18620	0	2	1.3	0.5	18614	0	2	0	6.3	0.7
SA	3979	0	1	1.7	1.1	3978	0	1	0	7.0	0.8
SV	1624	0	1	1.8	1.3	1612	0	2	0	6.2	1.0
UA	3483	1	31	1.7	0.0	3680	0	30	0	9.2	1.5
WA	632	4	10	1.9	0.5	628	3	60	0	12.9	-1.3
XX	4512	2	8	1.7	0.4	5131	0	100	0	12.9	0.7
N	687	0	25	2.6	0.9	706	0	23	0	9.3	1.4
ADS	1612	0	3	1.3	-0.2	1612	0	3	0	5.8	0.1
US ACARS	516690	0	13	1.4	0.2	516700	0	14	0	6.8	0.8

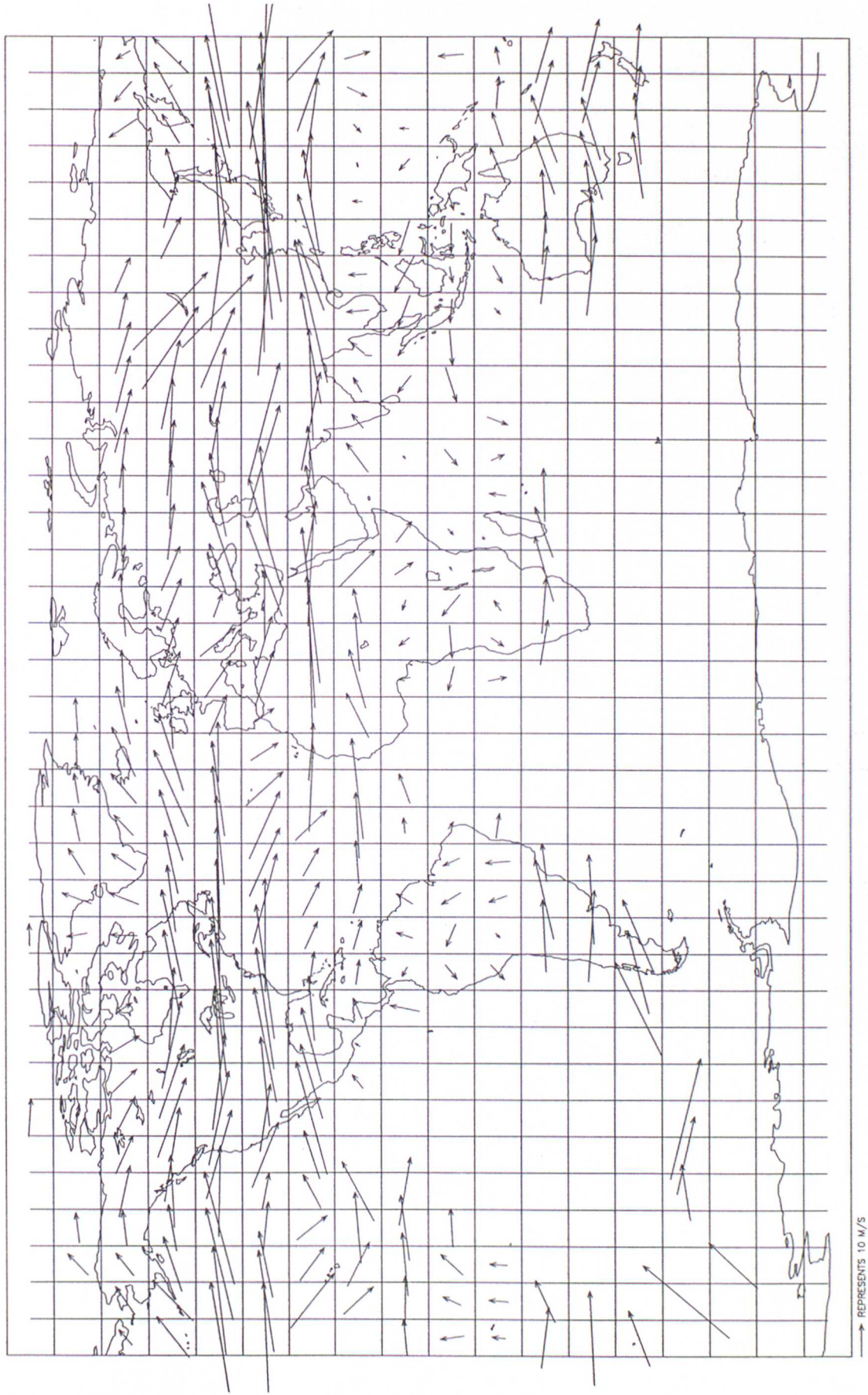
FIGURE 4

AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA

DECEMBER 1998

OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



→ REPRESENTS 10 M/S

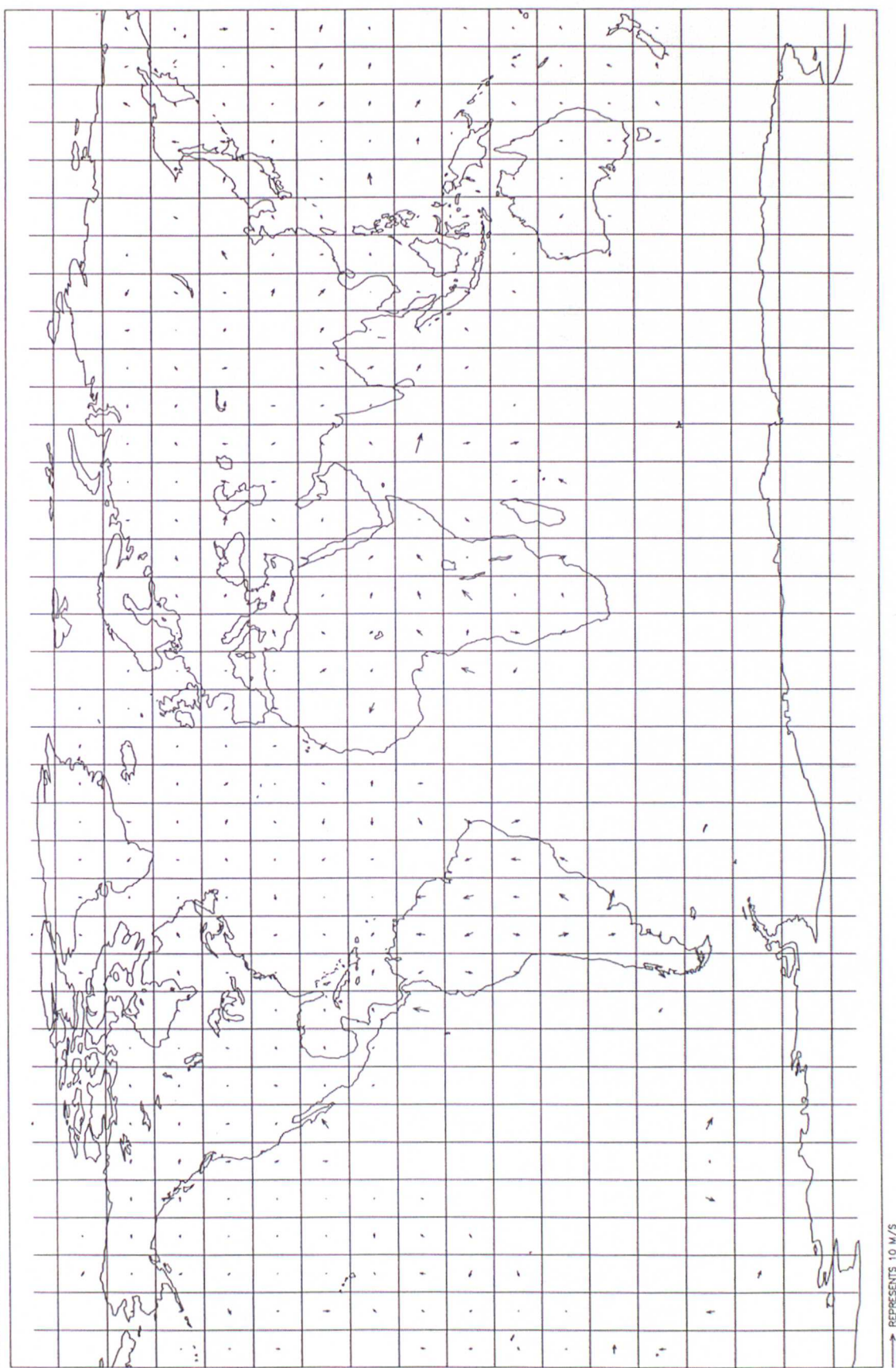
FIGURE 5

AIRCRAFT MEAN O-B WINDS BETWEEN 70 AND 500 HPA

DECEMBER 1998

OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

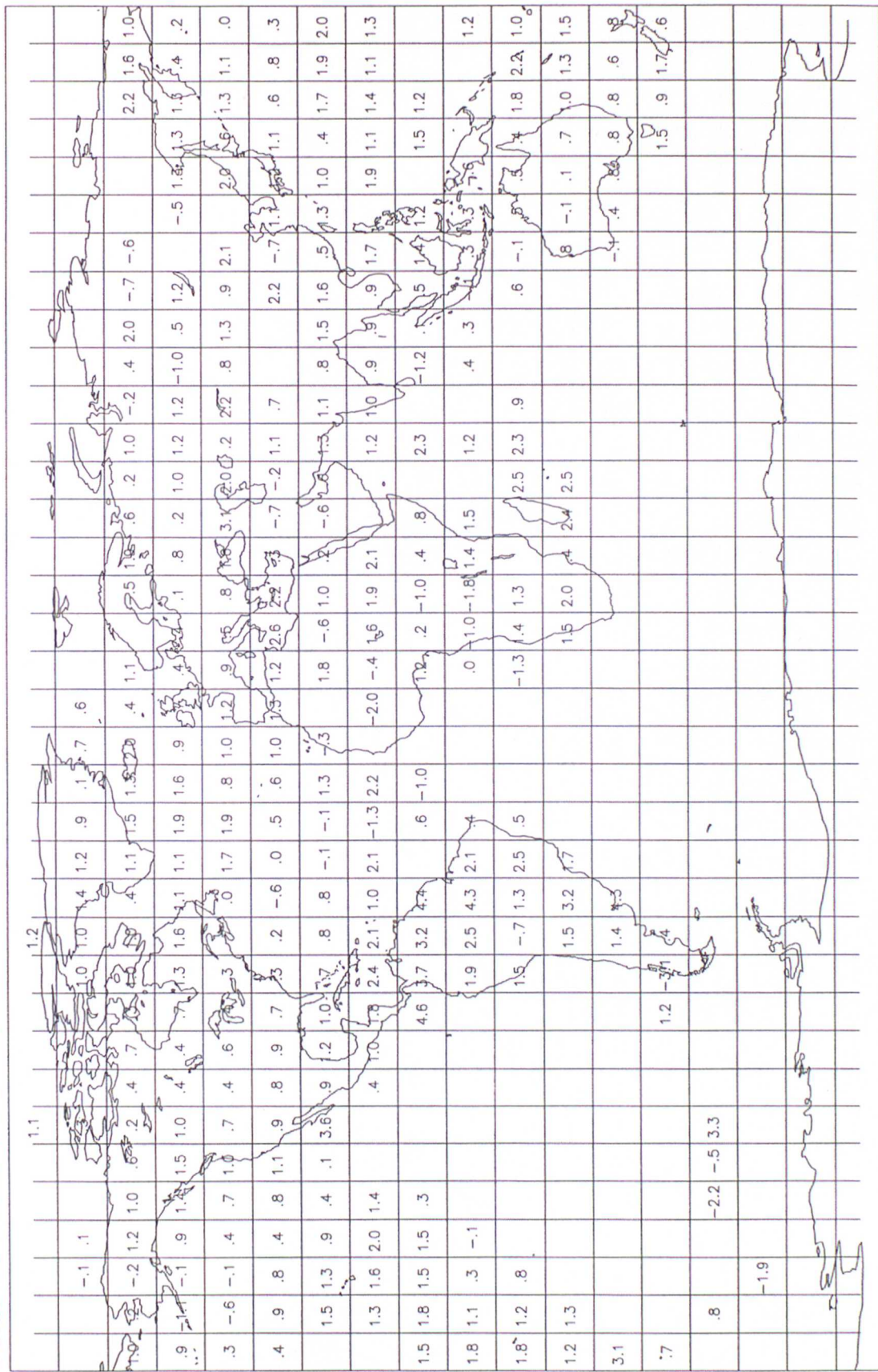
VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



→ REPRESENTS 10 M/S

DECEMBER 1998

OBSERVATIONS WITH O-B VECTOR DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT



DECEMBER 1990

OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

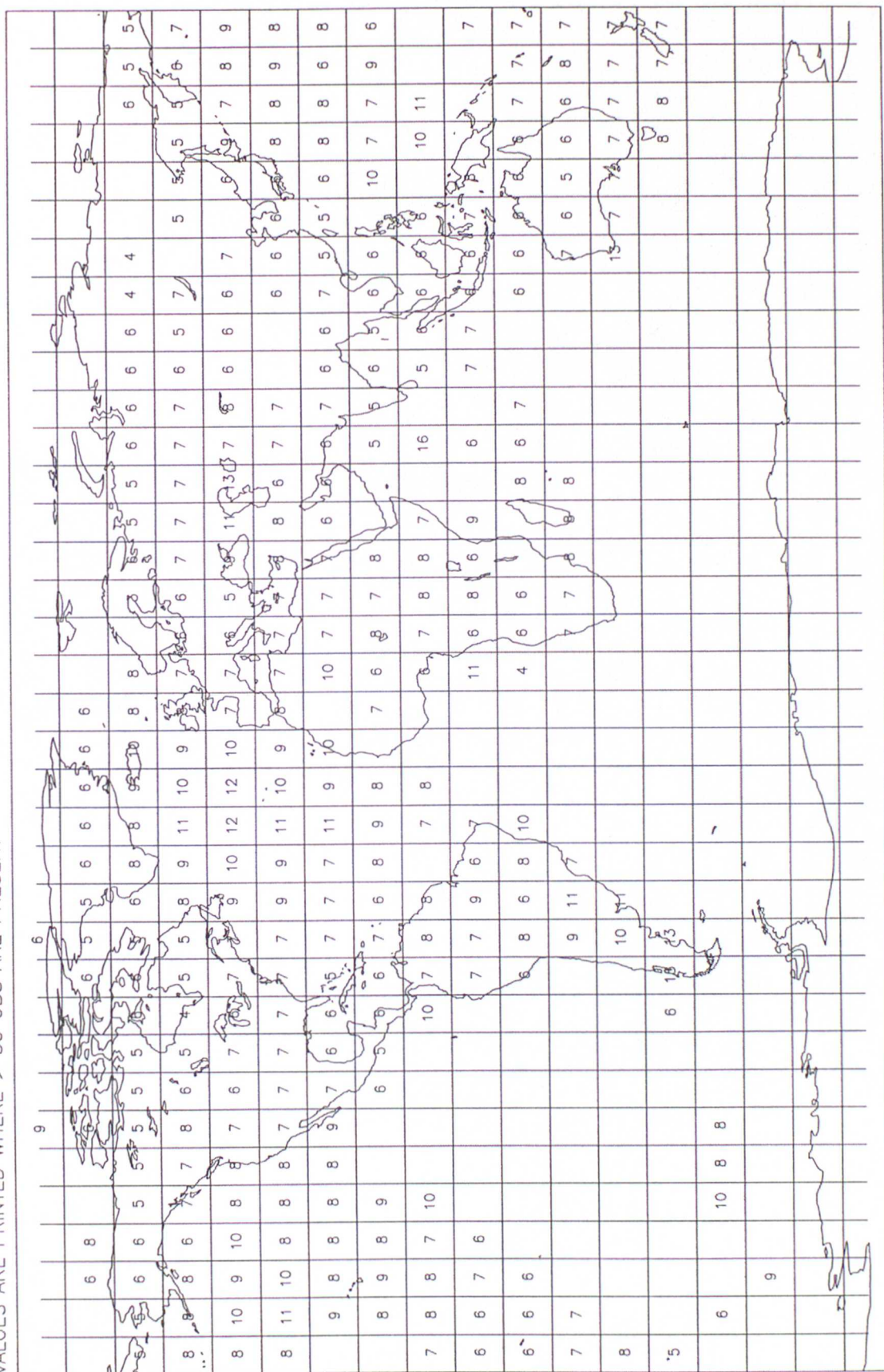


TABLE 5

**MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: December 1998**

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from Bracknell global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG		NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
27962	00	Z	200	53/	45	26	0	67.6	64.3	93.3	4
33658	00	Z	100	48/	26	15	0	27.6	178.8	180.9	6
42027	00	Z	1000	34/	75	13	8	26.0	66.6	71.5	9
42101	00	Z	150	30/	76	20	2	62.3	-116.8	132.4	9
42101	12	Z	250	30/	76	22	1	73.0	-48.1	87.4	7
42314	12	Z	150	27/	95	17	1	54.2	-104.1	117.3	7
42339	12	Z	200	26/	73	19	0	55.3	78.8	96.3	6
42369	12	Z	200	27/	81	11	0	96.5	-0.9	96.5	4
42397	00	Z	200	27/	88	24	0	53.7	-112.8	125.0	10
42397	12	Z	100	27/	88	21	0	106.9	-91.0	140.4	7
42647	12	Z	100	23/	73	22	0	89.3	88.2	125.5	4
42809	12	Z	150	23/	88	23	0	103.8	-22.8	106.2	6
43003	12	Z	100	19/	73	13	1	99.6	145.2	176.1	5
43014	00	Z	150	20/	75	11	0	94.2	-77.3	121.9	4
43150	00	Z	850	18/	83	30	0	10.2	-33.0	34.5	6
43185	00	Z	150	16/	81	23	0	91.6	-11.4	92.3	4
43185	12	Z	100	16/	81	15	0	92.8	108.8	143.0	5
43369	00	Z	150	8/	73	25	0	99.0	-95.8	137.7	6
43371	12	Z	150	8/	77	22	1	77.3	80.6	111.7	4
54161	00	Z	100	44/	125	23	0	58.6	100.5	116.3	6
54337	00	Z	200	41/	121	26	0	87.6	10.9	88.3	4
82599	12	Z	150	-6/	-35	15	0	104.2	-41.9	112.3	4
84628	12	Z	850	-12/	-77	14	0	6.8	-72.4	72.7	8
89009	00	Z	1000	-90/	0	5	22	52.3	43.2	67.9	8
89009	12	Z	850	-90/	0	20	0	30.9	61.3	68.7	9
89022	12	Z	300	-75/	-27	17	0	24.5	78.2	81.9	7
89512	00	Z	1000	-71/	12	14	13	13.7	89.6	90.6	10
97724	00	Z	400	-4/	128	22	0	46.9	-45.3	65.2	9

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS - 1027

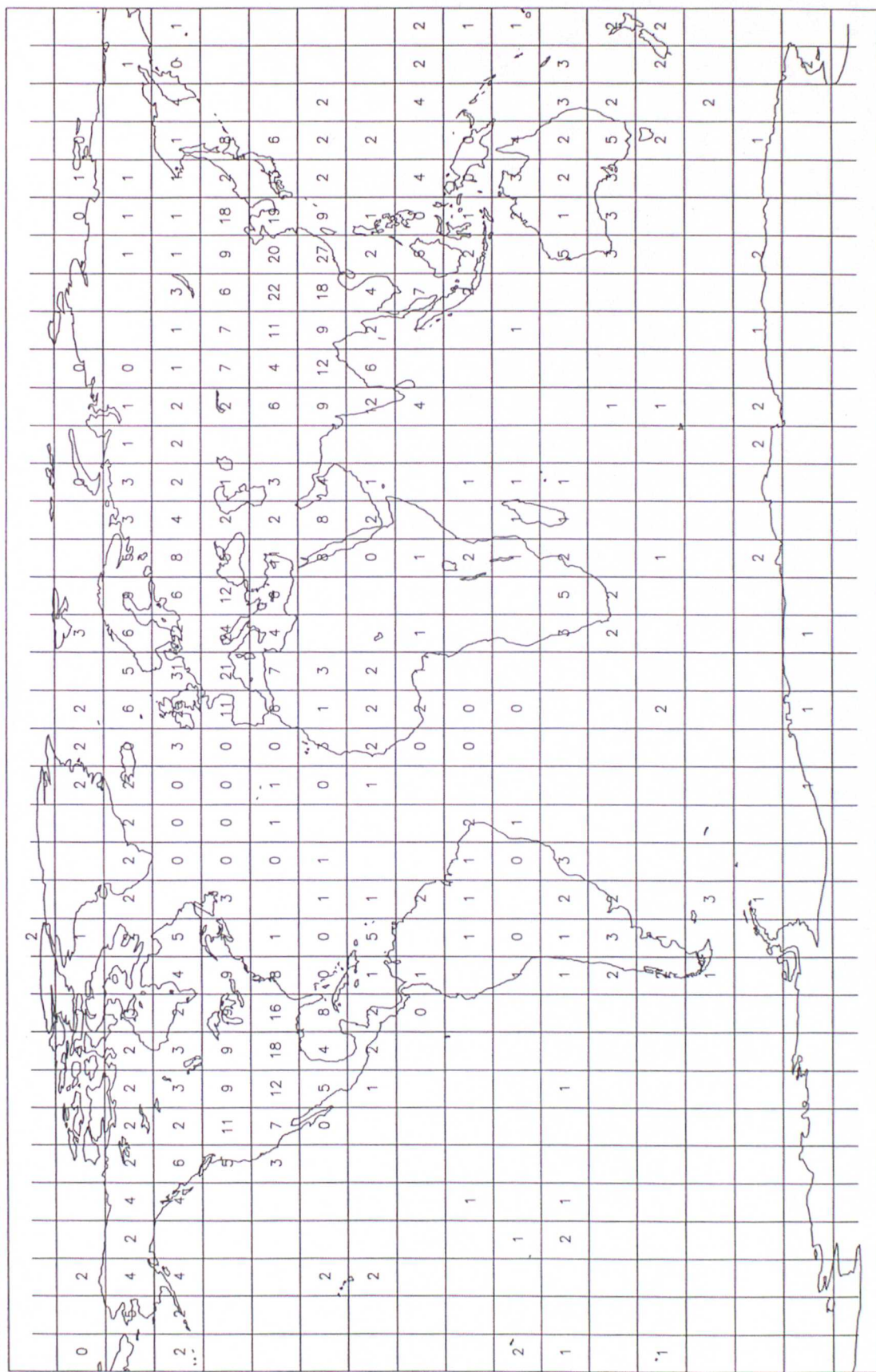


TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: December 1998

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from Bracknell global model.
Observation times	:00 UTC and 12 UTC.
Level(s) monitored	:Standard levels between 1000.0 - 100.0 hPa
Element monitored	:VECTOR WIND in m s^{-1}
Parameters monitored	
:NUM OBS	:Number of observations available at level shown during period.
:NUM GROSS	:Number of gross errors at level shown during period.
:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.2
SELECTION CRITERIA	: ≥ 10 observations and $\geq 15 \text{ m s}^{-1}$ RMS vector wind.

**ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST
RMS IS SHOWN**

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
17351	00	V	250	37/ 35	28	0	10	-9.8	-4.8	15.5	1
42182	00	V	150	29/ 77	11	0	18	2.7	-5.0	22.9	3
42182	12	V	200	29/ 77	14	1	33	-12.1	5.8	19.7	1
42397	00	V	150	27/ 88	22	0	0	3.0	-3.4	15.3	1
42397	12	V	150	27/ 88	21	0	4	-4.1	-3.8	15.2	1
42724	12	V	300	24/ 91	11	0	9	8.8	0.8	18.9	1
47881	00	V	100	34/ 135	10	0	10	-16.6	0.8	18.5	1
54497	00	V	250	40/ 124	29	0	6	-2.9	6.0	16.5	3
62306	00	V	200	31/ 27	13	0	15	12.3	-1.3	18.7	1
62378	12	V	200	30/ 31	21	0	9	-2.1	-3.4	17.5	1
62420	00	V	500	28/ 29	10	0	10	-21.8	-8.9	19.5	1
78486	12	V	250	18/ -70	15	0	26	-7.1	-0.7	16.5	1
94996	12	V	500	-29/ 168	11	0	18	4.3	-3.7	15.4	1

FIGURE 9

IN 24 HOURS

CURS - 1130

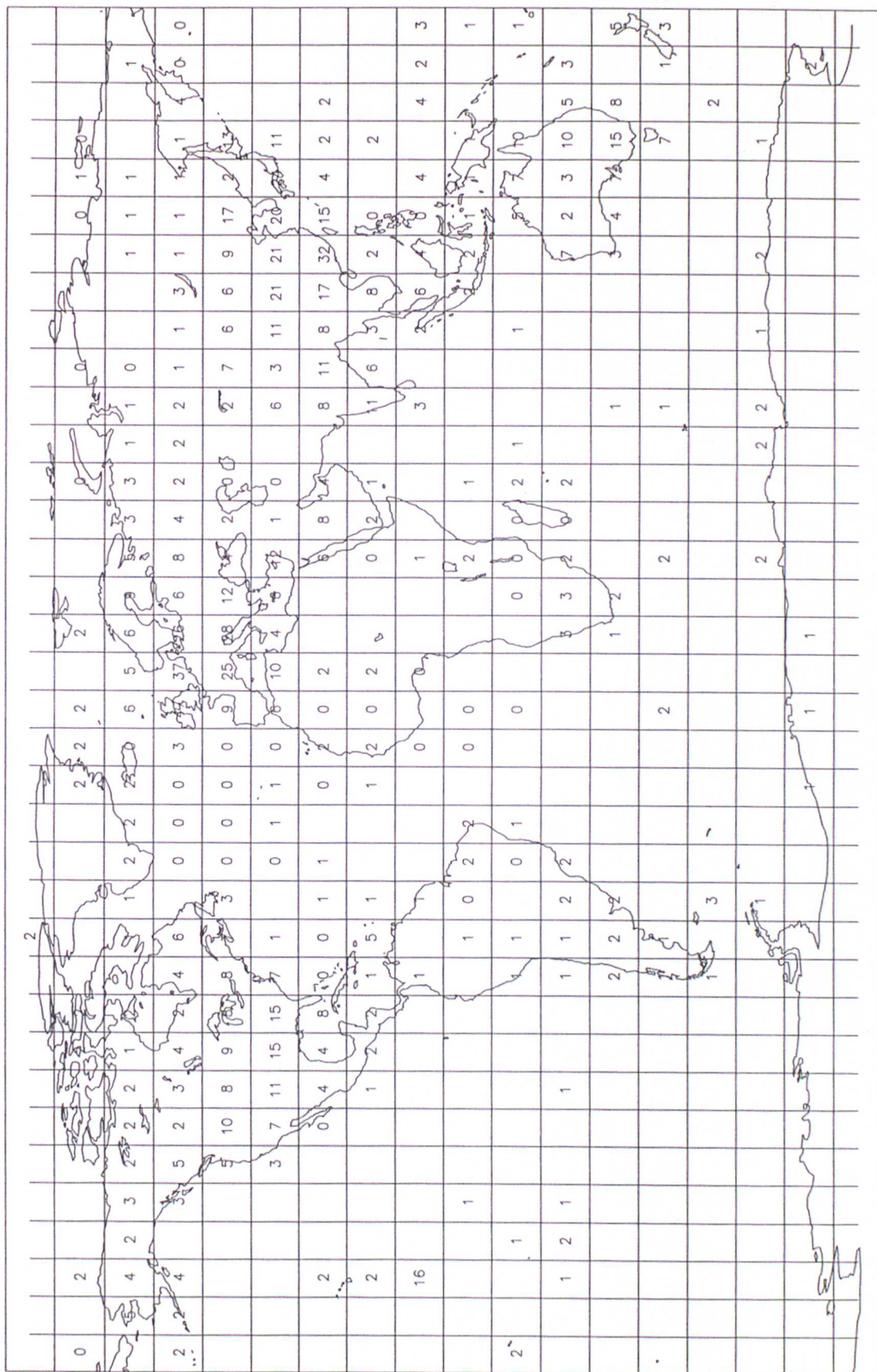


TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: December 1998

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from Bracknell global model.
Observation times	:00 UTC and 12 UTC.
Level(s) monitored	:Standard levels between 500.0 - 150.0 hPa
Element monitored	:WIND DIRECTION in degrees
Parameters monitored	
	:NUM OBS :Average number of observations at all levels.
	:BIAS :Mean difference of observations from background values from all levels.
	:MAX SPREAD : (For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD :SD of difference of observations from background values at all levels.
SELECTION CRITERIA	:NUM OBS ≥ 5 , and ABSOLUTE BIAS $\geq 10^\circ$, with SD $< 30^\circ$, and MAX SPREAD $< 10^\circ$

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
10828	00	DD	48/ 9	16	13.6	5.3	14.4
17240	00	DD	38/ 31	24	-10.9	3.2	15.1
17240	12	DD	38/ 31	21	-11.8	2.7	12.1
34731	00	DD	47/ 40	21	16.2	9.5	14.9
42339	00	DD	26/ 73	22	18.3	5.5	11.0
42339	12	DD	26/ 73	17	18.2	7.0	12.2
42397	12	DD	27/ 88	22	11.2	5.3	10.9
42701	12	DD	23/ 85	17	11.3	7.4	13.3
44288	12	DD	46/ 103	14	-11.4	4.3	10.0
48648	00	DD	3/ 102	19	11.7	8.6	24.0
48914	00	DD	9/ 105	5	27.8	6.2	15.9
62337	00	DD	31/ 34	27	-16.7	3.4	6.7
62337	12	DD	31/ 34	21	-18.8	1.6	5.9

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: December 1998

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from GOES, METEOSAT, GMS, INSAT.
Standard of comparison	:Background field from Bracknell global model.
Selection Criteria	:number of observations > 10.
Data Extracted	:Layer 701 - 1000 hPa 401 - 700 hPa 101 - 400 hPa
	:Mean wind
	:Mean observation minus background vector wind differences
	:Mean observation minus background speed differences
	:RMS of observation minus background vector differences

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
DECEMBER 1998

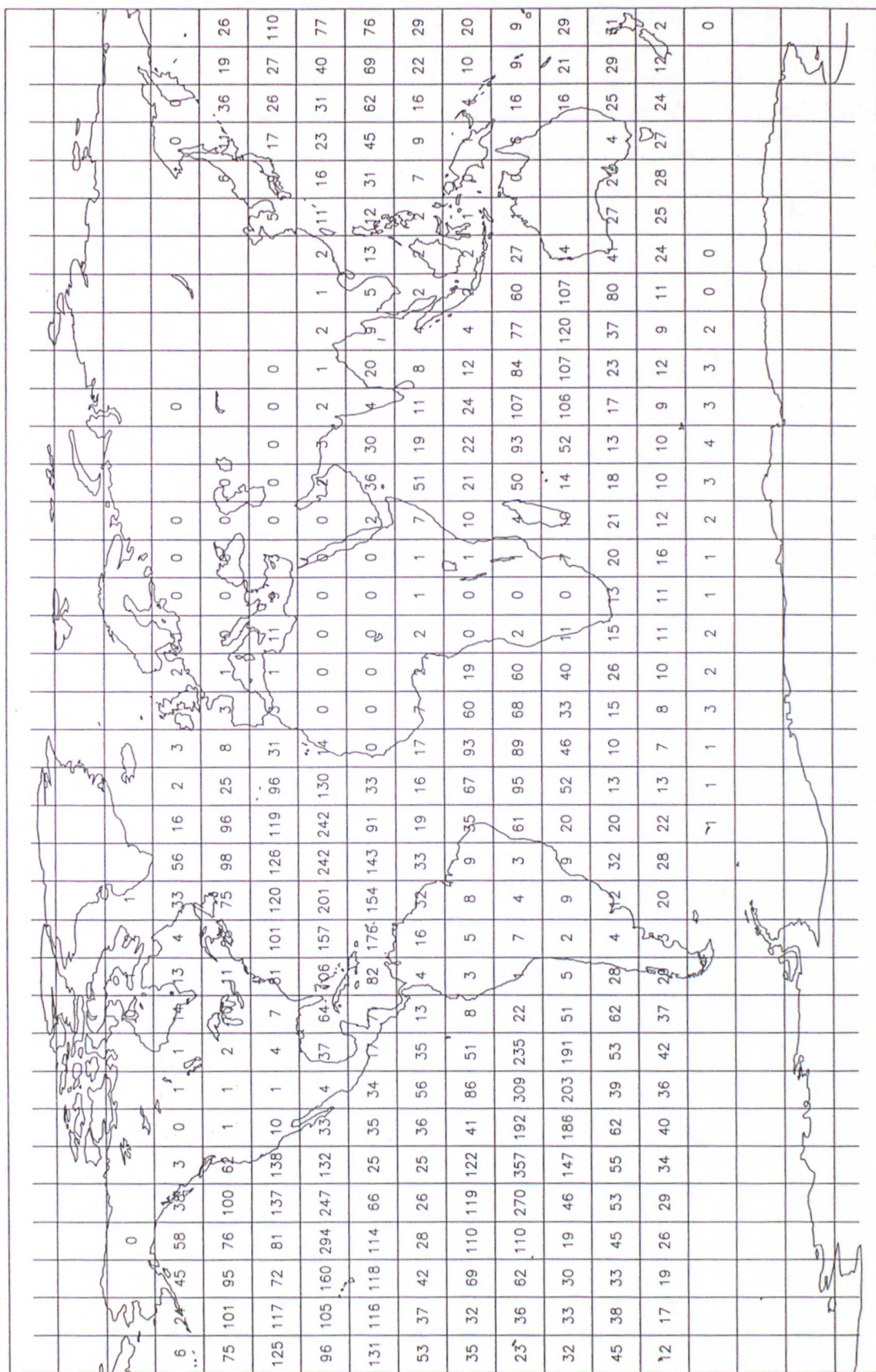


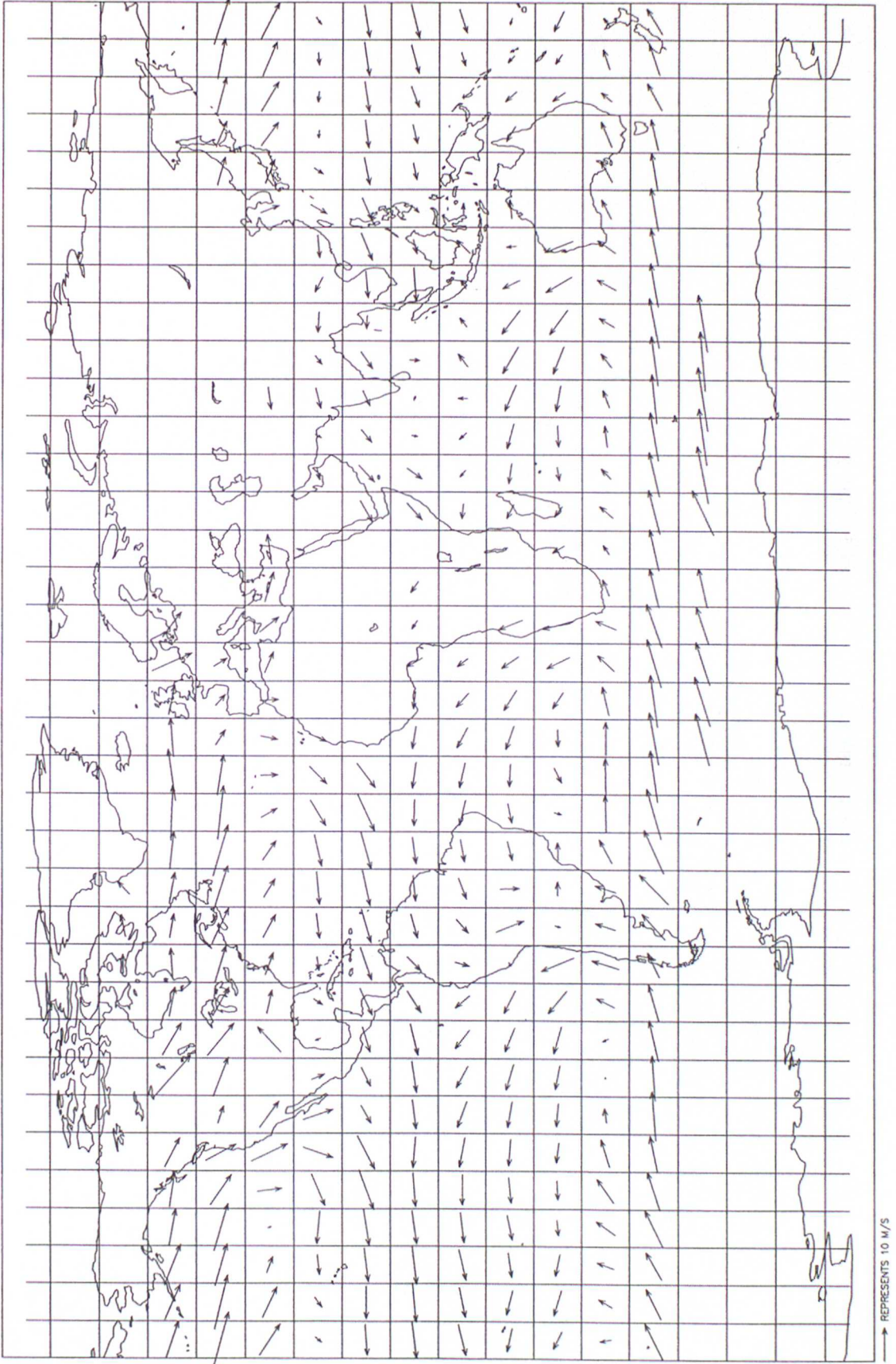
FIGURE 11

SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 701-1000 HPA

DECEMBER 1998

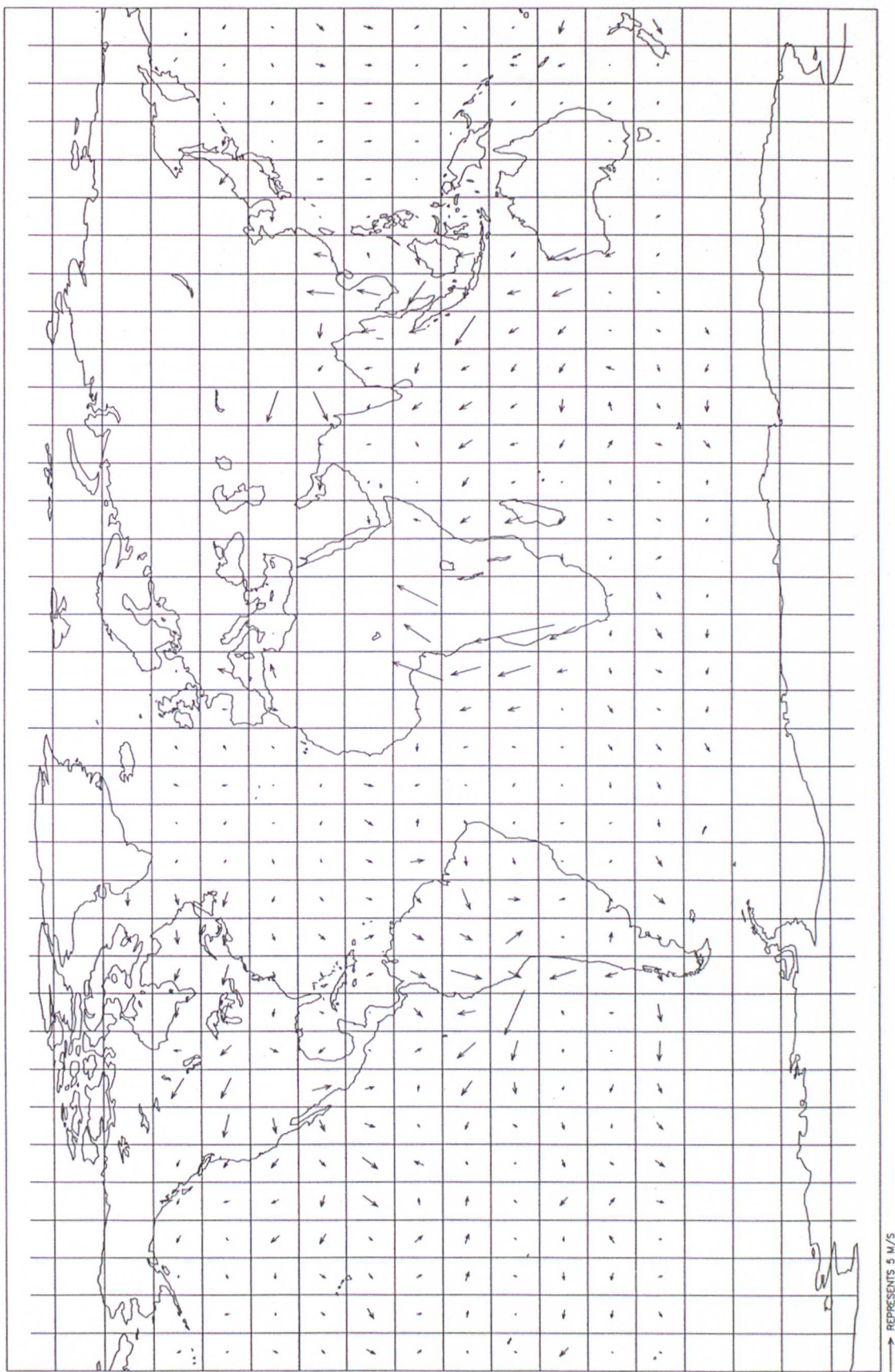
ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT



SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701-1000 HPA
DECEMBER 1998
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 12



AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
DECEMBER 1998

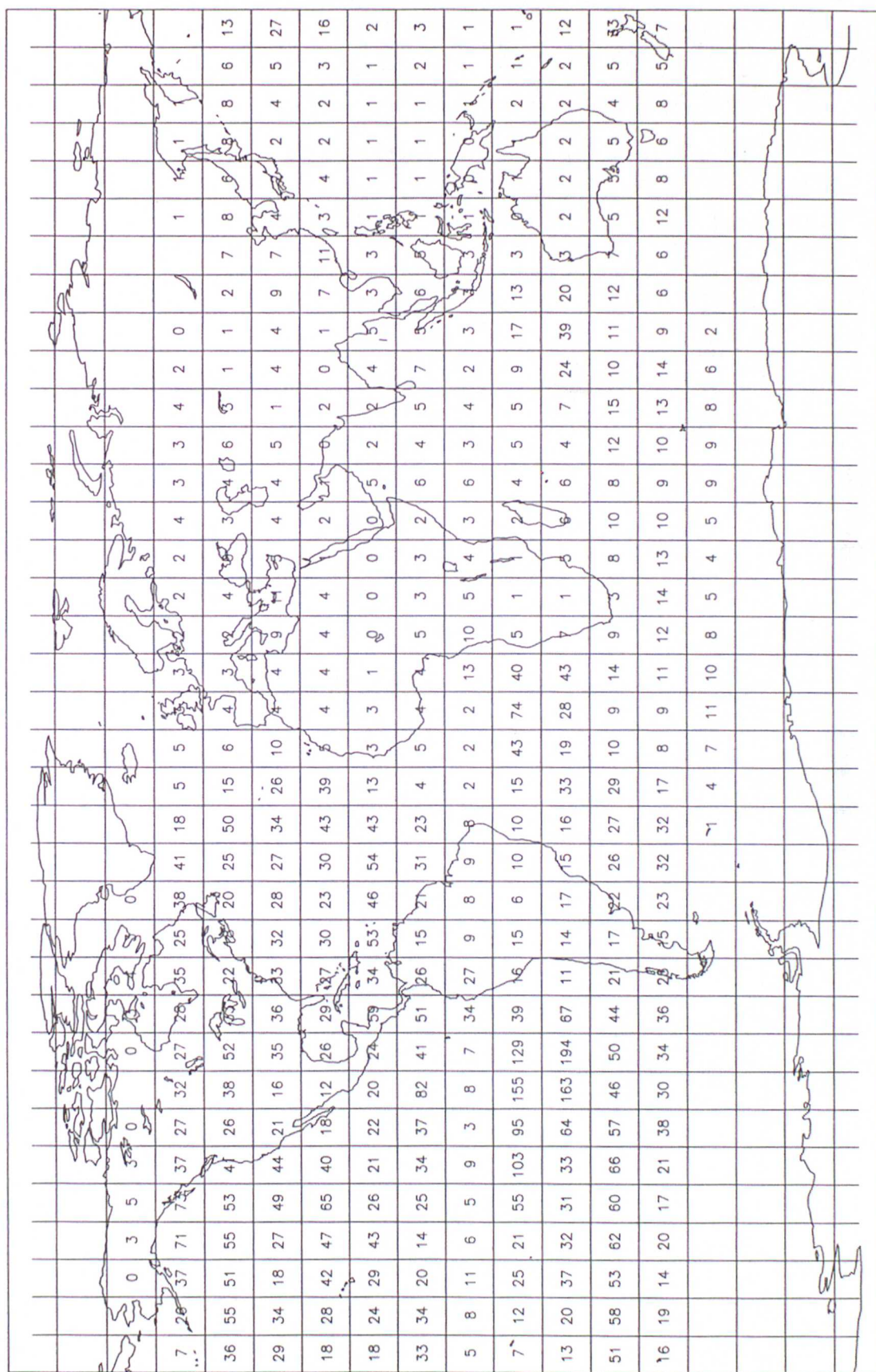


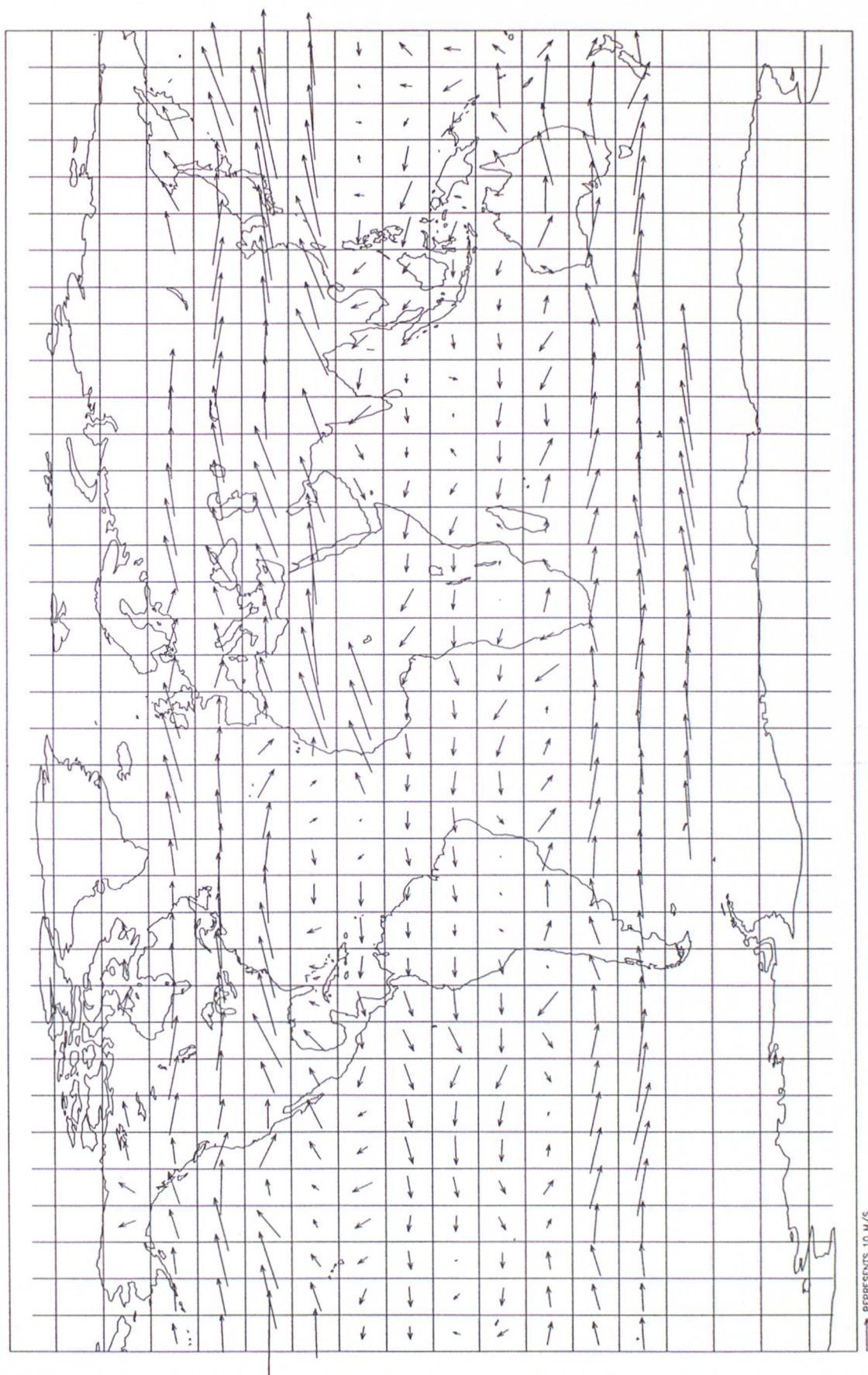
FIGURE 16

SATOB VECTOR MEAN WINDS BETWEEN 401-700 HPA

DECEMBER 1998

ALL OBSERVATIONS

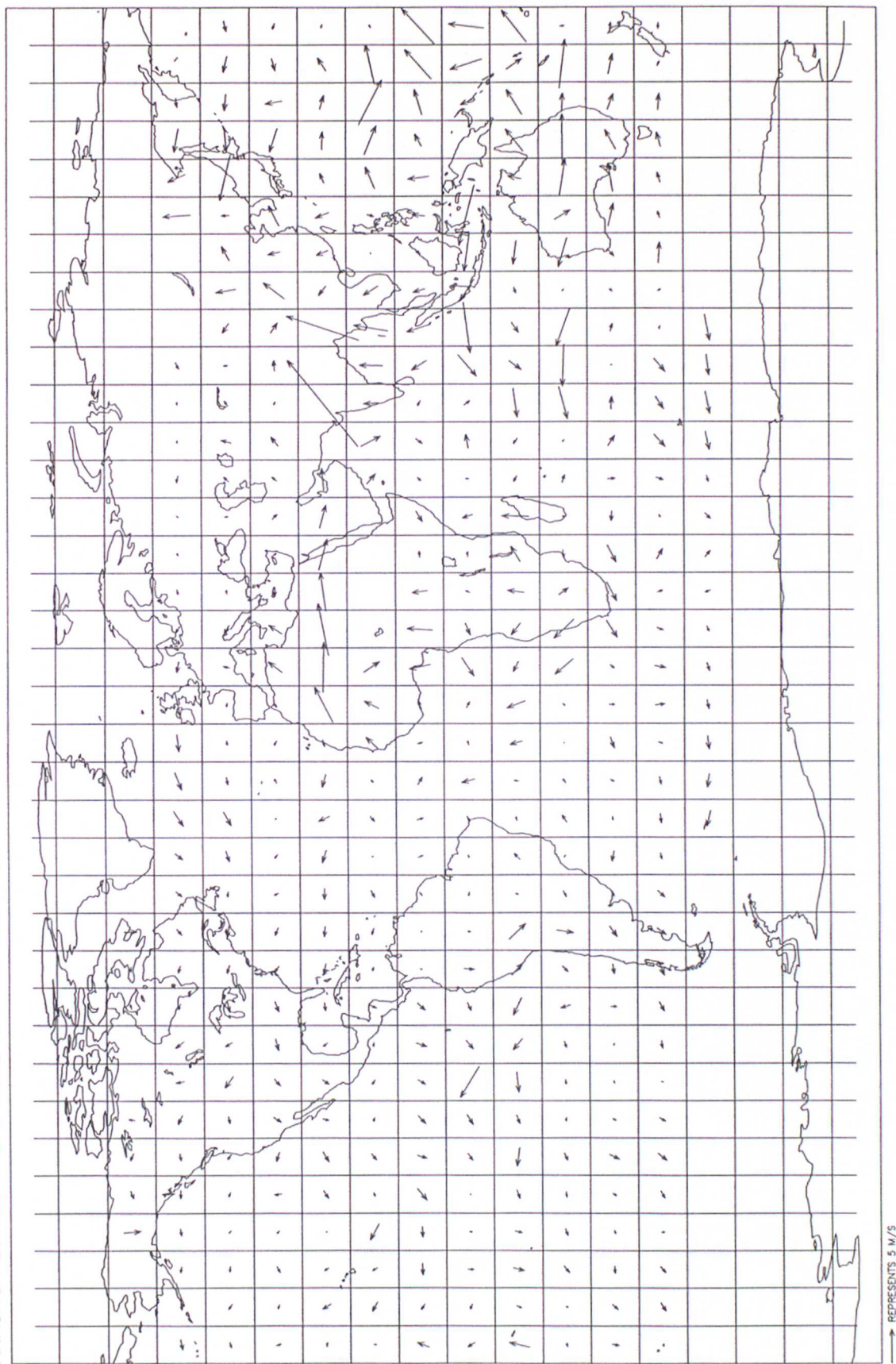
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT



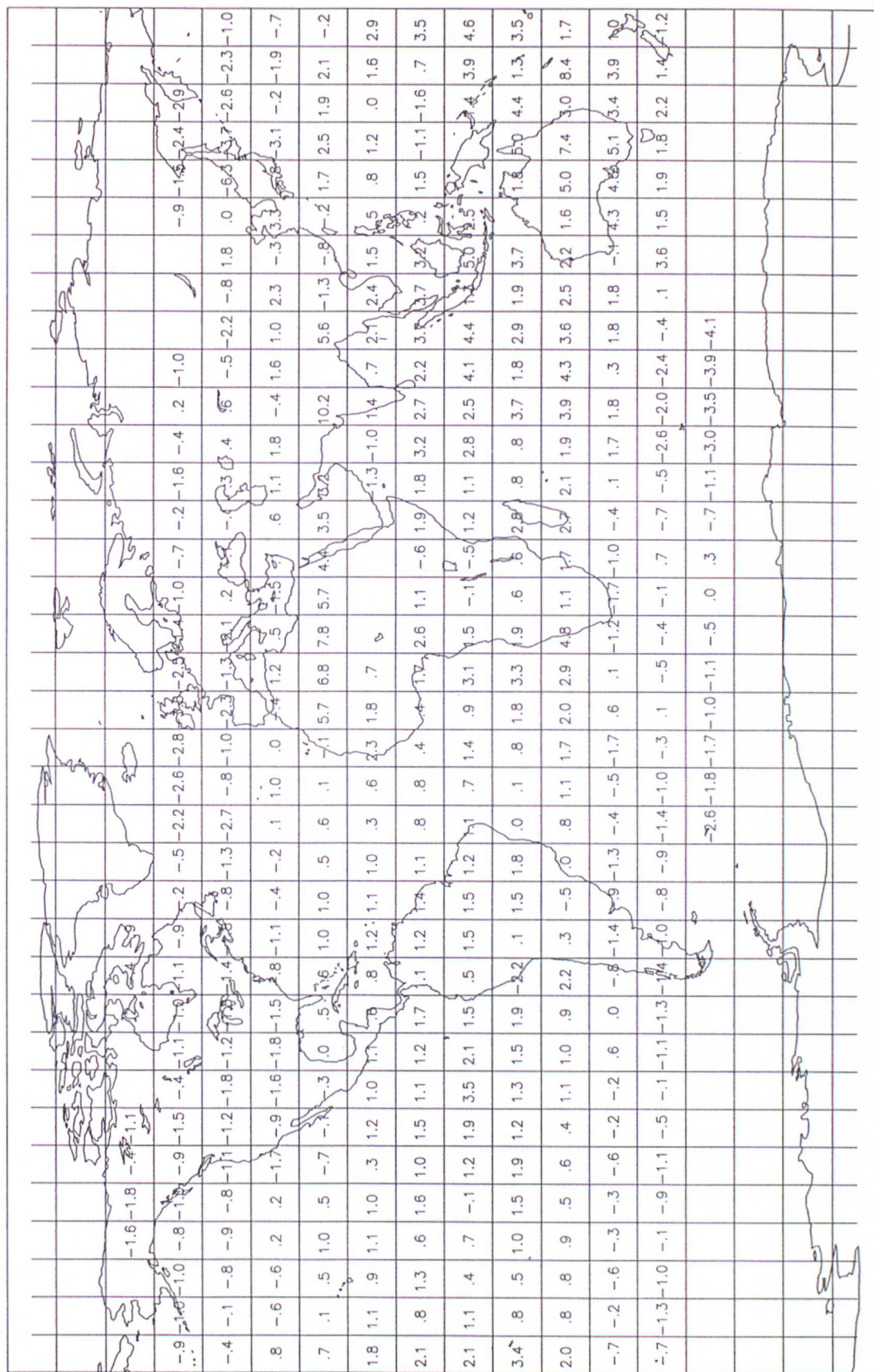
→ REPRESENTS 10 M/S

SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA
DECEMBER 1998
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 17



SATOB5 : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA
DECEMBER 1998
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT



AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
DECEMBER 1998

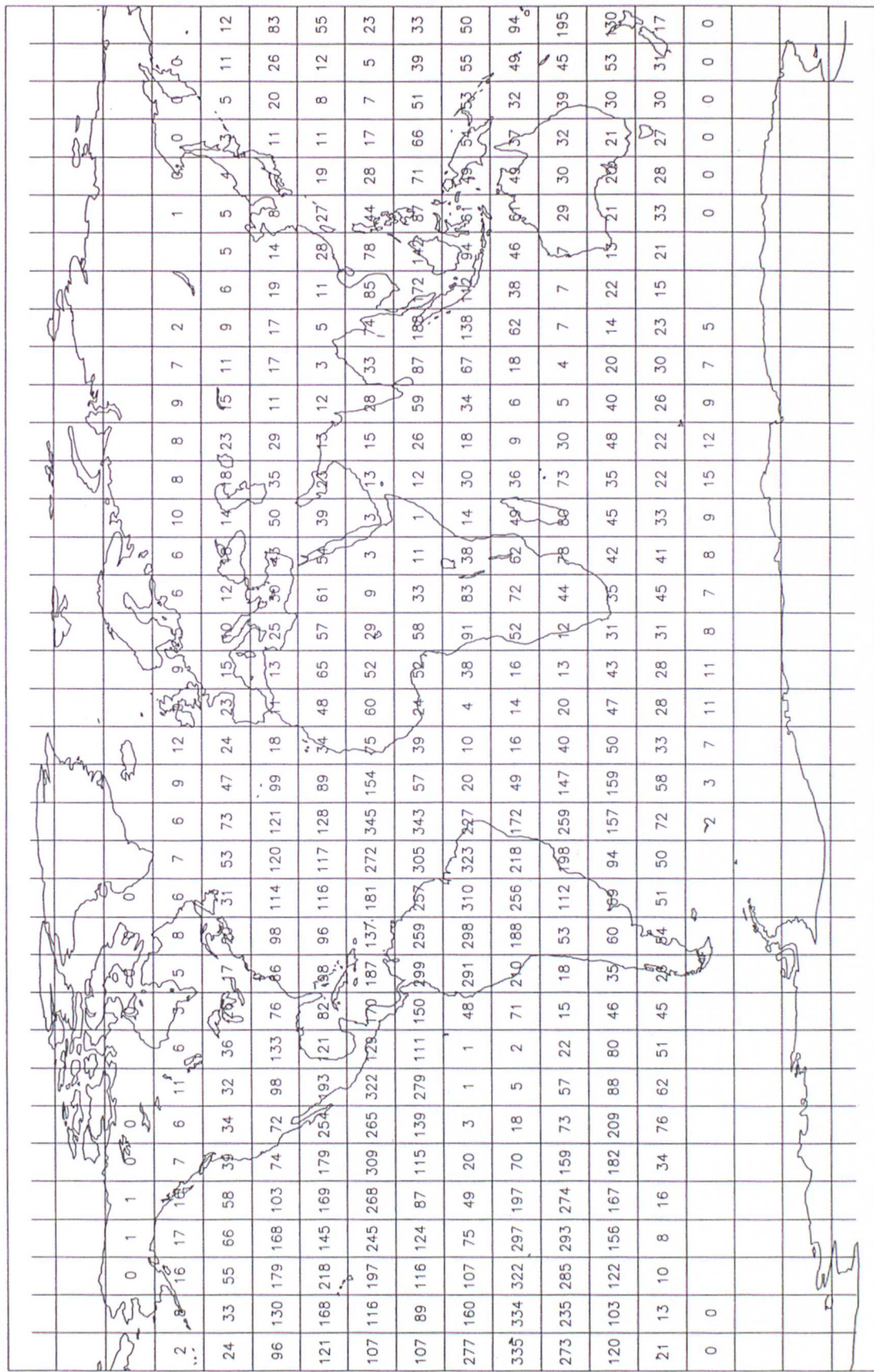


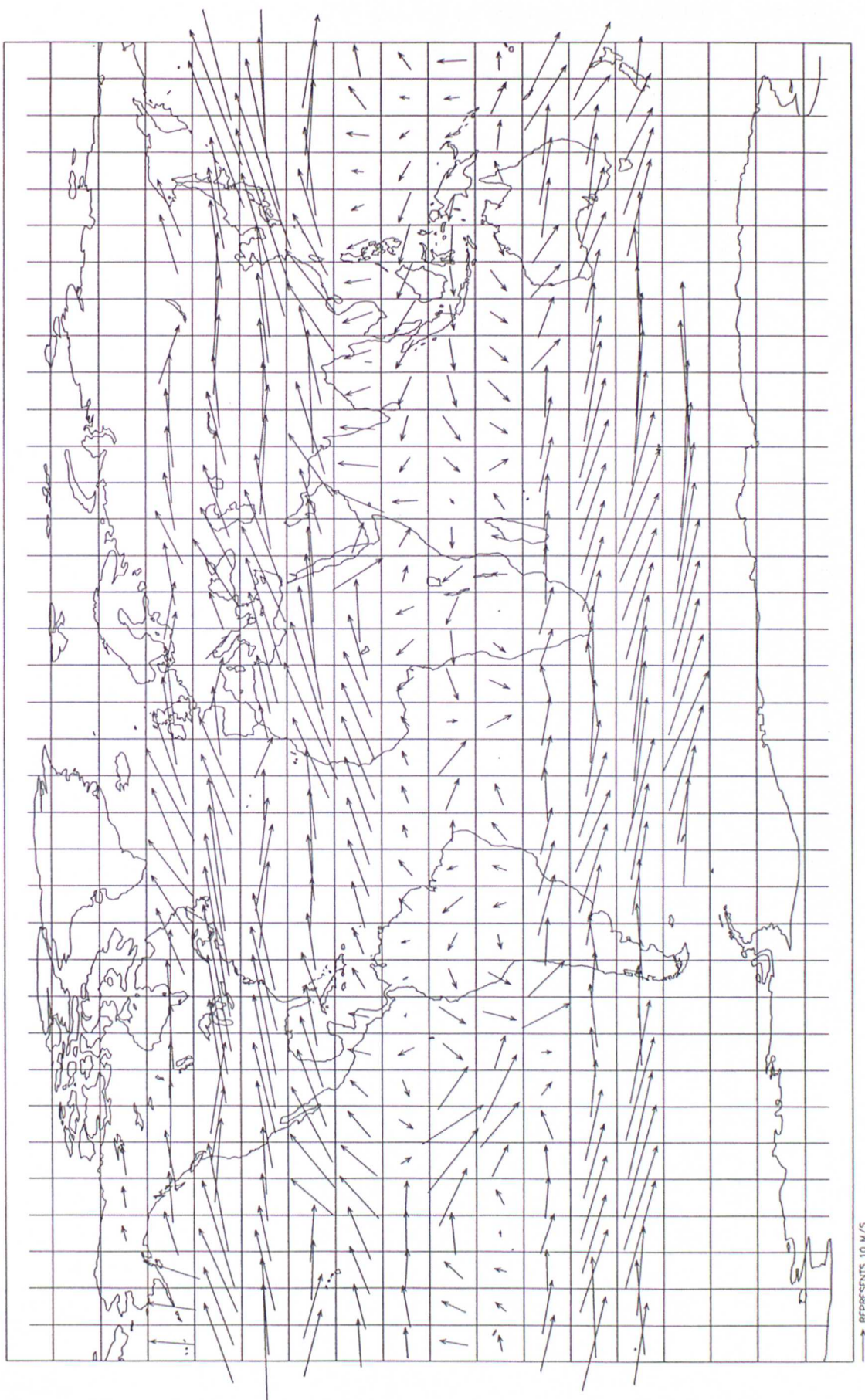
FIGURE 21

SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 101-400 HPA

DECEMBER 1998

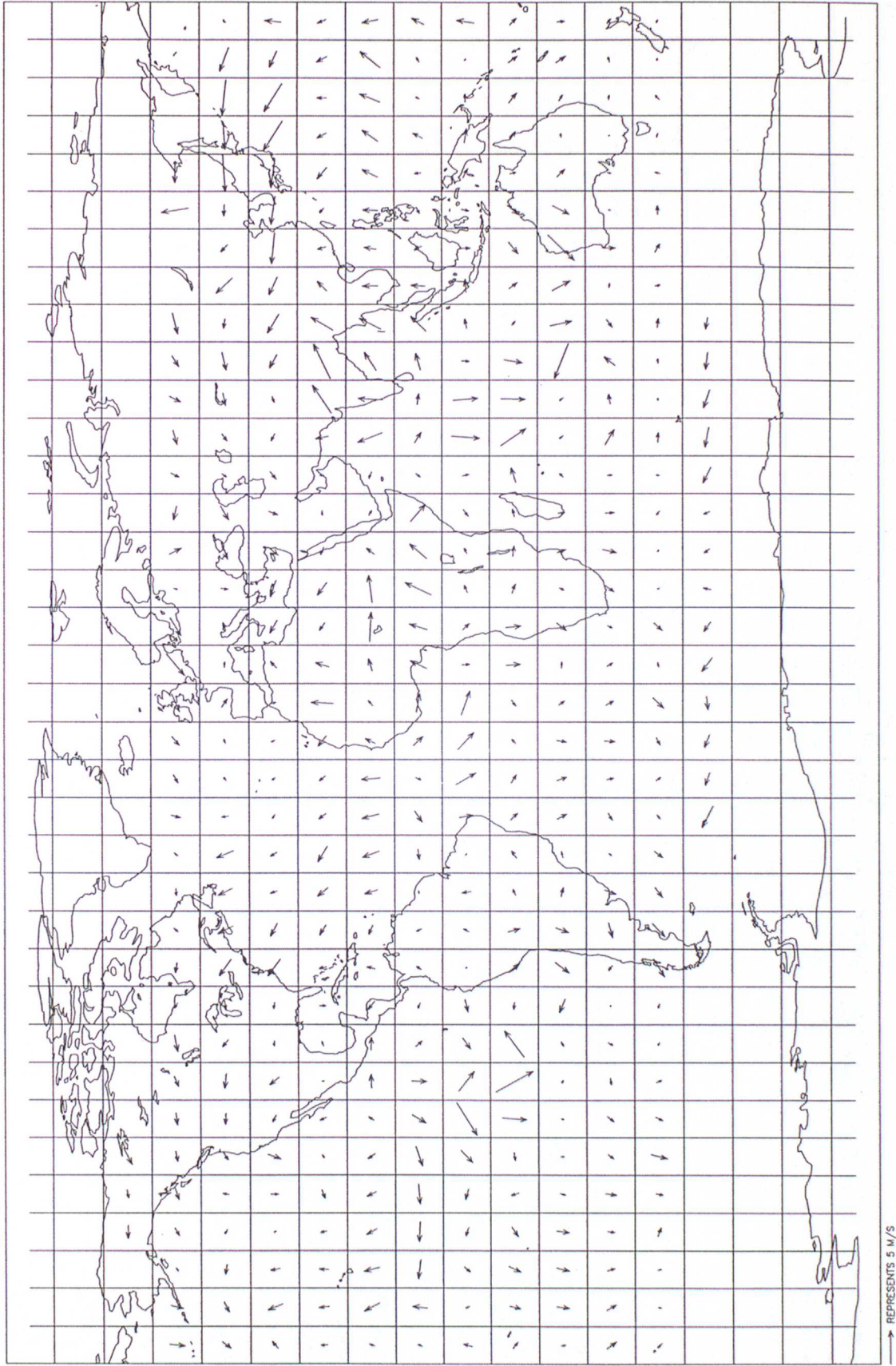
ALL OBSERVATIONS

ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

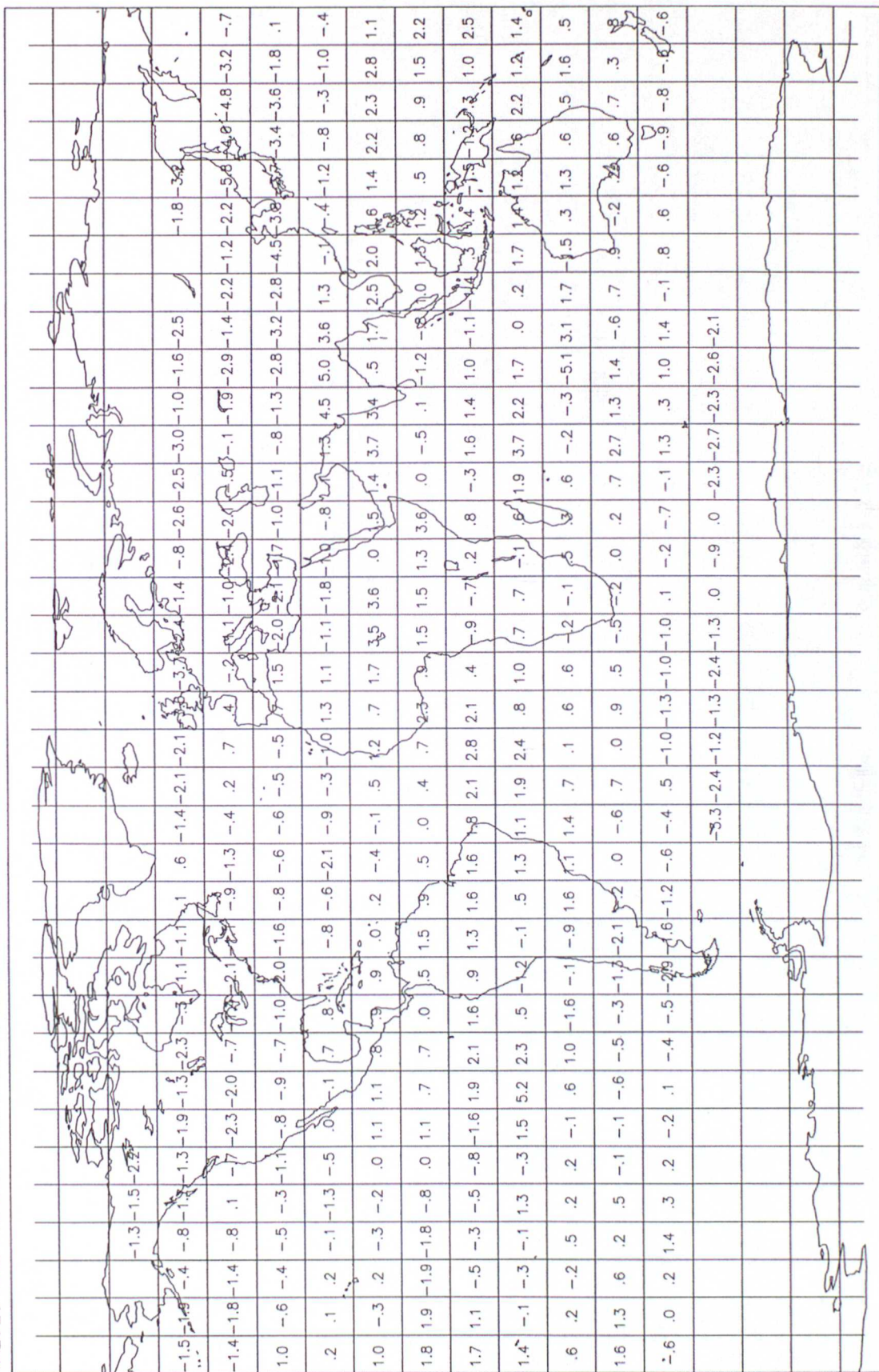


SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 101-400 HPA
DECEMBER 1998
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

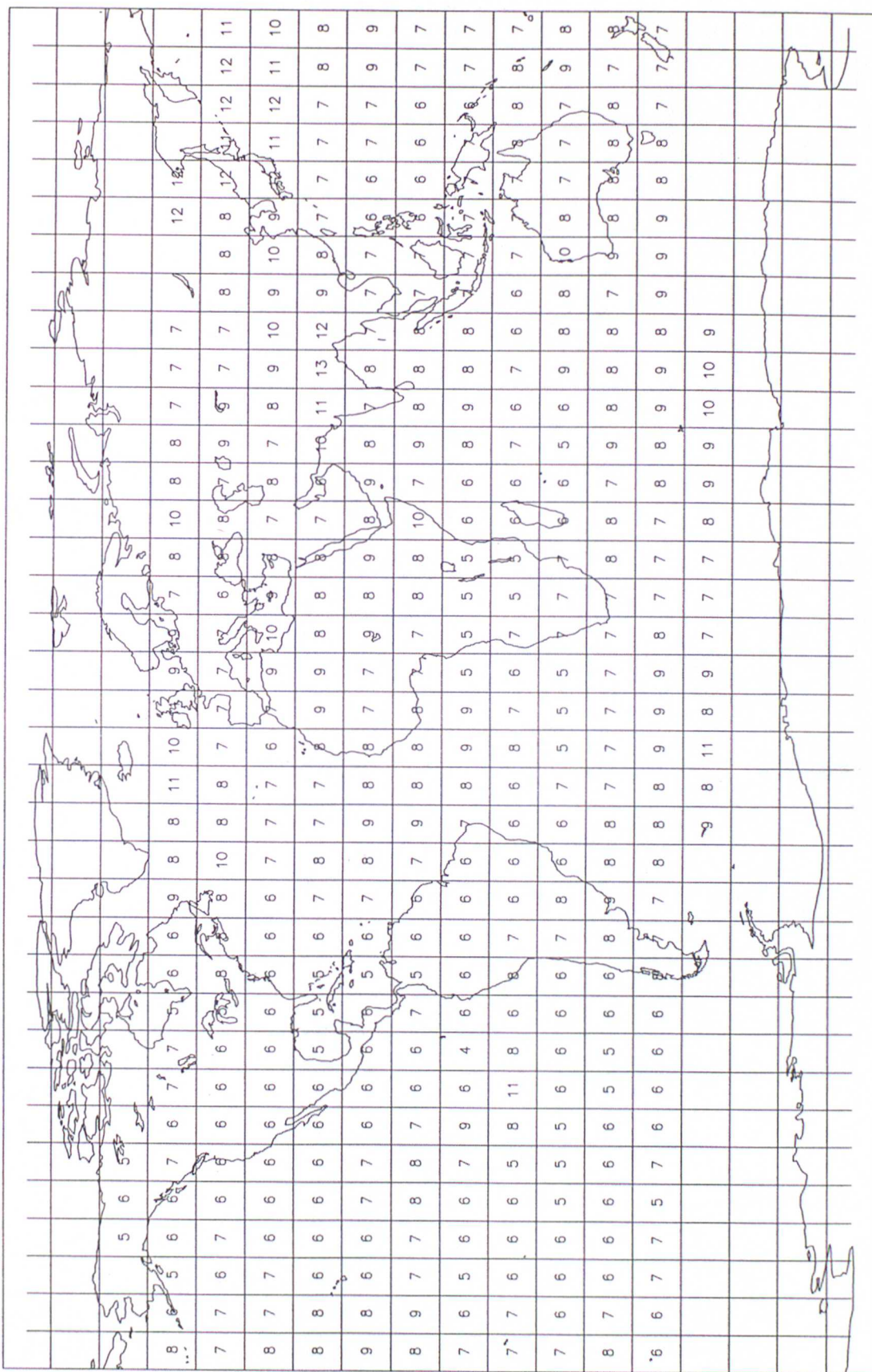
FIGURE 22



SATOB5 : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23
 DECEMBER 1998
 USING ALL OBSERVATIONS
 VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT



SATOB5 : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA
DECEMBER 1998
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT



MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: December 1998

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from NOAA-11, NOAA-14 500 km.
Standard of comparison	:Background field from Bracknell global model.
Selection Criteria	:All SATEM soundings where number of observations > 30.
Data Extracted	:Layer: 850 - 1000 hPa 100 - 300 hPa 30 - 50 hPa :Mean observation minus background temperature differences

NO DATA AVAILABLE

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: December 1998

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoy.
Area monitored		:10°N - 80°N, 85°W - 0°W
Standard of comparison		:Background field from Bracknell global model.
Position		:Average latitude and longitude for period.
Observation times		:All hours combined.
Elements monitored		:Mean sea-level pressure (hPa) :Wind speed (m s^{-1}) :Wind direction (degrees)
Parameters monitored		
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. N.B. A positive bias indicates the observation is veered to the background
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors
GROSS ERROR LIMITS	:15 hPa (pressure) :25 m s^{-1} (Vector Wind)	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
13503	19.3	-63.8	ALL	P	SUR	243	0	0	0.8	-0.5	0.9
13906	24.7	-49.3	ALL	P	SUR	79	0	0	0.9	-0.3	0.9
13913	14.7	-61.2	ALL	P	SUR	10	0	0	1.4	0.6	1.6
29812	34.9	-34.1	ALL	P	SUR	4	0	0	1.2	-0.6	1.3
33660	25.8	-72.5	ALL	P	SUR	3	0	0	0.5	-1.0	1.1
41502	20.9	-44.6	ALL	P	SUR	206	0	0	0.9	0.0	0.9
41503	24.1	-58.0	ALL	P	SUR	256	0	0	0.8	-0.1	0.8
41504	26.2	-66.4	ALL	P	SUR	262	0	0	0.8	0.2	0.9
41505	30.4	-64.4	ALL	P	SUR	271	0	0	0.8	0.2	0.9
41520	21.8	-45.9	ALL	P	SUR	204	0	0	0.8	0.5	1.0
41521	25.8	-61.6	ALL	P	SUR	276	0	0	0.8	0.0	0.8
41528	27.7	-69.9	ALL	P	SUR	253	0	0	0.8	0.3	0.9
41597	30.8	-27.6	ALL	P	SUR	574	0	0	0.9	-0.2	0.9
41598	27.2	-44.2	ALL	P	SUR	1320	28	2	1.1	0.4	1.1
41599	24.7	-38.8	ALL	P	SUR	424	6	1	0.8	-0.3	0.9
41625	26.3	-70.9	ALL	P	SUR	248	0	0	0.8	0.2	0.8
41626	24.6	-75.6	ALL	P	SUR	27	0	0	0.9	0.0	0.9
41629	26.1	-69.0	ALL	P	SUR	258	0	0	0.8	0.2	0.8
41632	13.7	-51.2	ALL	P	SUR	4	1	25	0.2	4.0	4.0
41633	14.1	-59.7	ALL	P	SUR	293	6	2	1.3	0.4	1.4
41636	18.6	-53.9	ALL	P	SUR	498	17	3	1.1	0.2	1.1
41637	24.1	-47.2	ALL	P	SUR	218	8	4	0.9	0.2	0.9
41638	18.6	-61.7	ALL	P	SUR	431	5	1	1.2	0.5	1.3
44601	52.3	-39.8	ALL	P	SUR	768	79	10	3.5	1.4	3.7
44602	56.1	-26.6	ALL	P	SUR	694	37	5	3.1	1.6	3.5
44603	53.9	-27.9	ALL	P	SUR	724	52	7	5.0	-2.5	5.6
44604	46.3	-29.9	ALL	P	SUR	552	1	0	2.9	0.9	3.0
44606	52.7	-36.9	ALL	P	SUR	440	0	0	3.0	0.9	3.1
44613	44.8	-26.8	ALL	P	SUR	815	9	1	2.0	-0.3	2.1
44726	59.3	-19.9	ALL	P	SUR	1435	2	0	2.5	-0.3	2.6
44742	46.2	-12.9	ALL	P	SUR	850	9	1	1.7	-0.3	1.7
44760	53.1	-31.3	ALL	P	SUR	1071	13	1	2.6	-0.8	2.7
44762	42.4	-49.3	ALL	P	SUR	465	0	0	2.0	0.7	2.1
44764	51.5	-38.1	ALL	P	SUR	627	6	1	2.5	-0.9	2.6
44772	53.6	-25.3	ALL	P	SUR	1218	22	2	3.3	-0.2	3.3
44774	52.9	-13.8	ALL	P	SUR	1102	16	1	2.3	-0.3	2.3
44775	57.8	-22.4	ALL	P	SUR	396	1	0	1.9	0.6	2.0
44778	49.2	-42.6	ALL	P	SUR	898	15	2	2.3	-0.8	2.4
44779	47.1	-26.9	ALL	P	SUR	762	6	1	1.9	-0.3	1.9
44813	42.4	-70.7	ALL	P	SUR	1	0	0	0.0	-3.9	3.9
44817	42.4	-70.7	ALL	P	SUR	1	0	0	0.0	-1.1	1.1
44901	54.8	-36.8	ALL	P	SUR	35	0	0	3.1	0.3	3.1
44912	53.0	-13.4	ALL	P	SUR	85	0	0	1.4	0.8	1.6
44925	53.7	-37.5	ALL	P	SUR	46	0	0	4.2	1.8	4.5
47556	71.0	-68.8	ALL	P	SUR	512	0	0	1.4	-0.4	1.5
61521	35.4	-3.3	ALL	P	SUR	84	0	0	1.0	-1.3	1.7
62511	46.5	-16.8	ALL	P	SUR	680	9	1	1.8	0.4	1.8
62512	46.4	-17.9	ALL	P	SUR	296	0	0	1.4	0.2	1.4
62513	48.1	-15.1	ALL	P	SUR	526	10	2	2.0	0.3	2.0
62515	60.7	-19.2	ALL	P	SUR	1902	3	0	2.3	0.5	2.4
62517	48.9	-15.9	ALL	P	SUR	436	53	12	3.9	5.5	6.7
62518	43.3	-15.5	ALL	P	SUR	187	187	100	0.0	0.0	0.0
62519	41.3	-20.6	ALL	P	SUR	1051	18	2	1.6	0.3	1.6
62520	44.5	-19.7	ALL	P	SUR	869	1	0	1.6	-0.4	1.6
62554	45.5	-16.4	ALL	P	SUR	887	0	0	1.5	0.3	1.5
62674	63.4	-20.3	ALL	P	SUR	262	0	0	2.2	0.4	2.2
62758	41.6	-16.2	ALL	P	SUR	3	0	0	1.2	-0.3	1.2
64529	61.5	-27.4	ALL	P	SUR	1189	5	0	2.3	-1.1	2.6
64563	62.2	-10.6	ALL	P	SUR	91	45	49	1.9	-2.0	2.7
64903	44.7	-63.6	ALL	P	SUR	5	5	100	0.0	0.0	0.0

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
65571	63.2	-20.3	ALL	P	SUR	1578	52	3	3.9	-2.0	4.4
65581	58.8	-26.9	ALL	P	SUR	519	0	0	2.4	-0.7	2.5
65591	55.3	-35.7	ALL	P	SUR	809	2	0	2.5	-1.0	2.7
65592	59.6	-39.6	ALL	P	SUR	1084	5	0	2.4	-0.7	2.5
65597	55.0	-8.4	ALL	P	SUR	483	2	0	1.3	-0.4	1.3
65599	62.6	-30.9	ALL	P	SUR	1495	6	0	2.0	-0.2	2.0
WINS SPEED											
13503	19.3	-63.8	ALL	SPEED	SUR	261	0	0	1.4	-2.0	2.4
29812	34.9	-34.1	ALL	SPEED	SUR	4	0	0	0.4	0.1	0.4
33660	25.8	-72.5	ALL	SPEED	SUR	4	0	0	2.3	-1.1	2.5
41504	26.2	-66.4	ALL	SPEED	SUR	316	0	0	1.3	-0.3	1.3
41520	21.8	-45.9	ALL	SPEED	SUR	251	0	0	2.8	1.2	3.0
41521	25.8	-61.6	ALL	SPEED	SUR	334	0	0	1.5	-0.7	1.7
41522	15.6	-73.3	ALL	SPEED	SUR	202	0	0	5.1	-0.7	5.1
41599	24.7	-38.8	ALL	SPEED	SUR	397	0	0	2.6	0.0	2.6
41625	26.3	-70.9	ALL	SPEED	SUR	332	0	0	1.6	-0.6	1.8
41626	24.6	-75.6	ALL	SPEED	SUR	26	0	0	0.8	-8.8	8.8
41629	26.1	-69.0	ALL	SPEED	SUR	304	0	0	1.4	-0.7	1.6
41632	13.7	-51.2	ALL	SPEED	SUR	3	0	0	0.2	-0.3	0.4
41633	14.1	-59.7	ALL	SPEED	SUR	234	1	0	3.6	-1.0	3.7
41636	18.6	-53.9	ALL	SPEED	SUR	455	1	0	2.2	-1.8	2.9
41637	24.1	-47.2	ALL	SPEED	SUR	172	0	0	2.2	0.9	2.4
41638	18.6	-61.7	ALL	SPEED	SUR	286	1	0	1.5	-1.0	1.8
44601	52.3	-39.8	ALL	SPEED	SUR	512	12	2	3.8	0.4	3.8
44602	56.1	-26.6	ALL	SPEED	SUR	412	15	4	4.0	-0.9	4.1
44613	44.8	-26.8	ALL	SPEED	SUR	2	1	50	0.0	9.9	9.9
44762	42.4	-49.3	ALL	SPEED	SUR	477	4	1	3.9	2.8	4.8
62511	46.5	-16.8	ALL	SPEED	SUR	4	1	25	7.8	2.5	8.2
62513	48.1	-15.1	ALL	SPEED	SUR	4	0	0	6.4	11.4	13.1
62515	60.7	-19.2	ALL	SPEED	SUR	3	1	33	0.0	1.3	1.3
62517	48.9	-15.9	ALL	SPEED	SUR	832	0	0	2.1	-0.9	2.2
62518	43.3	-15.5	ALL	SPEED	SUR	3	0	0	4.7	-5.4	7.1
62519	41.3	-20.6	ALL	SPEED	SUR	2	2	100	0.0	0.0	0.0
65599	62.6	-30.9	ALL	SPEED	SUR	1294	3	0	4.0	-0.9	4.1
WIND DIRECTION											
13503	19.3	-63.8	ALL	DIRN.	SUR	221	0	0	12.0	6.7	13.8
29812	34.9	-34.1	ALL	DIRN.	SUR	2	0	0	0.8	21.9	22.0
33660	25.8	-72.5	ALL	DIRN.	SUR	2	0	0	13.3	-7.3	15.2
41502	20.9	-44.6	ALL	DIRN.	SUR	207	0	0	28.8	12.2	31.3
41503	24.1	-58.0	ALL	DIRN.	SUR	246	0	0	28.9	18.1	34.0
41504	26.2	-66.4	ALL	DIRN.	SUR	207	0	0	15.3	10.8	18.7
41520	21.8	-45.9	ALL	DIRN.	SUR	151	0	0	15.4	-12.6	19.9
41521	25.8	-61.6	ALL	DIRN.	SUR	214	0	0	20.5	-15.1	25.5
41522	15.6	-73.3	ALL	DIRN.	SUR	157	0	0	21.6	1.2	21.7
41523	19.5	-62.8	ALL	DIRN.	SUR	16	0	0	0.0	2.5	2.5
41598	27.2	-44.2	ALL	DIRN.	SUR	912	0	0	29.6	0.6	29.6
41599	24.7	-38.8	ALL	DIRN.	SUR	231	0	0	19.3	2.8	19.5
41625	26.3	-70.9	ALL	DIRN.	SUR	159	0	0	14.3	6.8	15.8
41626	24.6	-75.6	ALL	DIRN.	SUR	14	0	0	41.2	-35.8	54.6
41629	26.1	-69.0	ALL	DIRN.	SUR	203	0	0	12.5	4.3	13.2
41632	13.7	-51.2	ALL	DIRN.	SUR	4	0	0	4.3	-16.7	17.3
41633	14.1	-59.7	ALL	DIRN.	SUR	150	1	1	23.7	-2.4	23.8
41636	18.6	-53.9	ALL	DIRN.	SUR	301	1	0	16.2	11.7	20.0
41637	24.1	-47.2	ALL	DIRN.	SUR	135	0	0	19.5	-6.2	20.5
41638	18.6	-61.7	ALL	DIRN.	SUR	275	1	0	16.2	15.8	22.6
44601	52.3	-39.8	ALL	DIRN.	SUR	426	12	3	48.8	-43.2	65.1
44602	56.1	-26.6	ALL	DIRN.	SUR	400	15	4	55.4	18.7	58.5
44613	44.8	-26.8	ALL	DIRN.	SUR	1	1	100	0.0	0.0	0.0
44762	42.4	-49.3	ALL	DIRN.	SUR	444	4	1	24.3	-7.3	25.3

IDENTIFIER	LAT.	LONG.	HOURL	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
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WIND DIRECTION

62511	46.5	-16.8	ALL	DIRN.	SUR	2	1	50	0.0	73.6	73.6
62513	48.1	-15.1	ALL	DIRN.	SUR	1	0	0	0.0	-56.1	56.1
62515	60.7	-19.2	ALL	DIRN.	SUR	1	1	100	0.0	0.0	0.0
62517	48.9	-15.9	ALL	DIRN.	SUR	620	0	0	18.7	0.0	18.7
62519	41.3	-20.6	ALL	DIRN.	SUR	2	2	100	0.0	0.0	0.0
65599	62.6	-30.9	ALL	DIRN.	SUR	856	3	0	34.5	4.3	34.8

TABLE 9

**MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: December 1998**

Monitoring procedures:		
Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:40°N - 70°N, 60°W - 0°W.
Standard of comparison		:Background field from Bracknell global model.
Observation times		:All hours combined.
Level(s) monitored		:300.0 - 150.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s ⁻¹
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s ⁻¹ Vector Wind	
SELECTION CRITERIA	:N REP ≥ 20	

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				BIAS
		PG	PR	RMS	PG		PR	PC	RMS		
AAL	2498	0	3	1.9	0.0	2508	0	4	0	9.6	0.8
ACA	1070	0	1	1.8	-0.2	1075	0	2	0	7.7	0.8
AEA	133	1	23	1.7	0.5	133	1	26	0	11.0	0.9
AEL	520	1	24	2.3	-0.6	532	0	23	0	9.5	1.5
AEY	40	0	3	1.6	0.5	40	0	5	0	11.3	-0.4
AFL	258	1	7	2.2	0.7	260	0	5	0	8.1	0.8
AFR	1302	1	12	2.0	0.3	1333	0	12	0	9.4	1.2
AIH	115	1	8	2.1	0.4	115	0	6	0	8.8	2.5
AJM	84	0	1	2.0	-0.4	85	1	7	0	11.5	1.1
AMM	63	0	6	1.7	0.1	62	0	5	0	10.1	0.8
AMX	216	2	6	2.1	-0.1	219	1	7	0	11.9	0.7
ANZ	188	0	6	2.1	-1.1	190	1	8	0	8.2	-0.1
AOM	301	0	4	1.8	0.8	313	1	4	0	9.4	1.8
AVA	131	3	10	2.0	0.1	141	0	11	0	11.3	1.9
AZA	248	0	100	2.3	0.2	255	0	10	0	10.8	0.8
BAL	314	0	19	2.0	-0.5	324	0	20	0	9.9	2.0
BAW	1245	1	12	2.2	-0.1	1277	0	12	0	9.0	0.9
BLX	48	2	6	2.4	-0.2	50	0	6	0	14.0	0.0
BWA	93	0	2	2.6	1.9	94	0	5	0	11.5	2.0
CDN	551	0	2	2.0	0.6	547	0	3	0	8.4	1.6
CFC	26	0	12	1.2	0.6	27	0	11	0	10.3	2.3
CFG	477	0	4	2.0	-0.5	481	0	6	0	9.8	0.7
CKT	96	0	7	1.8	0.6	97	1	12	0	11.2	2.0
CLX	286	1	3	1.7	-0.6	287	1	5	0	9.3	0.9
CMM	58	0	7	1.8	0.3	56	0	5	0	9.9	0.6
COA	604	1	4	2.0	-0.1	616	0	10	0	13.9	3.7
CRL	224	0	3	1.8	0.4	224	0	5	0	9.2	1.6
CTB	150	1	3	2.0	-0.9	154	0	3	0	8.7	-0.1
CUB	218	0	11	2.0	0.8	221	1	13	0	10.7	1.0
DAL	1147	0	10	2.0	-0.6	1156	0	12	0	10.2	1.0
DBY	325	1	2	1.8	-0.6	328	0	2	0	10.2	0.6
DLH	1930	0	11	1.9	0.0	1902	0	11	0	8.4	1.3
ELY	125	0	7	1.8	0.0	129	0	9	0	9.2	2.2
EWV	79	1	1	1.8	0.7	78	0	4	0	8.5	1.3
FDX	458	1	6	1.9	0.1	460	0	6	0	10.7	1.4
FIN	462	0	5	1.8	0.1	452	0	7	0	8.6	0.7
GTI	80	0	13	2.0	0.3	82	0	12	0	7.8	0.2
HLF	36	0	8	1.6	-0.5	37	0	8	0	12.7	-1.3
IBE	1094	0	22	2.0	0.6	1102	1	24	0	10.8	0.9
ICE	831	0	2	1.6	0.2	808	0	3	0	7.5	0.5
JKK	130	1	14	1.8	-0.1	128	1	14	0	9.6	1.3
KLM	1885	0	5	1.9	0.1	1892	0	6	0	9.2	0.7
LDA	92	1	17	1.9	0.2	95	0	18	0	9.4	0.5
LDI	319	5	100	2.4	-1.0	322	0	23	0	10.4	0.2
LIB	104	0	6	2.0	1.1	105	2	6	0	9.7	2.5
LOT	127	0	4	2.3	-1.3	125	0	6	0	10.7	-0.3
LTU	344	0	3	1.9	-0.6	354	0	6	0	10.8	1.8
MAS	66	2	5	1.7	0.4	70	1	10	0	11.3	1.0
MON	20	0	10	1.7	1.2	20	0	15	0	10.4	1.7
MPD	48	0	6	2.4	-0.1	48	0	10	0	14.5	1.1
MPH	456	0	3	1.9	-0.4	463	0	5	0	9.3	1.3
NCA	26	0	0	1.8	-0.8	25	0	0	0	8.9	0.0
NWA	2638	1	2	2.0	0.7	2676	0	3	0	8.8	0.8
PAC	48	0	10	2.2	0.3	46	0	15	0	9.7	0.9
RAM	44	0	5	1.9	-0.7	46	0	4	0	7.1	2.5
RCH	97	1	8	1.8	0.3	100	3	14	0	9.5	1.6
RRR	39	0	28	2.2	0.9	40	0	25	0	8.2	-1.0
SAB	44	2	2	1.8	-0.1	46	0	0	0	5.4	0.3
SAS	1134	0	1	2.0	-0.1	1127	0	3	0	8.9	0.7

IDENT.	N.REP.	TEMPERATURE				N.REP.	WIND				BIAS
		PG	PR	RMS	PG		PR	PC	RMS		
SIA	180	0	6	2.1	-0.6	186	0	6	0	8.1	-0.3
SLR	97	1	18	1.9	-0.3	100	0	17	0	9.3	2.0
SVA	98	0	8	1.8	-0.5	104	1	12	0	10.7	-0.5
SWR	87	0	2	2.0	0.5	90	0	4	0	8.4	1.5
TAP	250	1	11	1.7	-0.2	250	1	14	0	10.9	1.9
TOW	87	0	2	1.5	0.0	89	0	7	0	10.7	1.2
TSC	26	0	4	1.7	0.5	27	0	4	0	8.0	-0.1
TSO	27	0	4	1.2	-0.3	27	4	4	0	6.8	-0.6
TWA	760	1	4	2.0	0.4	764	0	3	0	8.7	1.3
UAL	1591	0	6	1.9	-0.1	1602	0	5	0	7.4	0.8
UPS	543	0	26	1.9	0.2	550	0	26	0	10.6	1.4
USA	165	0	2	1.6	-0.1	165	1	5	0	9.4	1.0
VIR	283	0	1	2.2	-0.2	289	0	2	0	9.1	0.9
VKG	58	0	3	1.7	0.4	57	0	2	0	7.3	1.3
WOA	49	0	14	2.5	0.1	50	0	18	0	15.2	0.2
BA	4458	0	3	1.6	0.1	4458	0	1	0	7.3	0.7
KL	1620	0	1	2.0	1.1	1620	0	1	0	7.7	1.1
LH	336	0	0	1.9	0.9	336	0	0	0	7.5	0.9
N	277	0	8	3.1	1.7	280	0	6	0	8.4	1.4
ADS	49	0	0	1.4	-0.5	49	0	2	0	7.5	2.2
US ACARS	11818	0	5	1.9	0.5	11818	0	2	0	7.7	0.7

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: December 1998

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from Bracknell global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS		:Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	12	Z	100	10	0	20.1	22.8	10.7
DBLK	00	Z	100	1	0	0.0	20.0	20.0
DBLK	12	Z	100	8	0	14.8	15.1	-2.8
ELML5	00	Z	100	1	0	0.0	2.0	2.0
ELML7	00	Z	100	18	0	16.3	17.2	5.4
ELML7	12	Z	100	15	0	12.1	22.9	19.4
FNOR	00	Z	100	11	0	12.0	28.2	25.5
FNOR	12	Z	100	7	0	10.0	25.9	23.9
FNOU	00	Z	100	9	0	9.1	10.3	4.8
FNOU	12	Z	100	7	0	14.4	19.6	13.3
FNPB	00	Z	100	8	0	15.9	17.8	8.1
FNPB	12	Z	100	10	0	15.4	26.9	22.1
FNRS	00	Z	100	12	1	14.6	15.2	-4.4
FNRS	12	Z	100	11	0	13.9	15.3	6.4
JDWX	00	Z	100	1	0	0.0	30.0	30.0
LDWR	00	Z	100	22	1	14.1	14.1	0.9
LDWR	12	Z	100	22	0	11.1	12.3	5.4
OVYA2	00	Z	100	13	0	13.4	15.2	-7.2
OVYA2	12	Z	100	8	0	23.8	24.4	5.5
OXYH2	00	Z	100	8	0	18.0	19.9	-8.5
OXYH2	12	Z	100	8	0	40.0	40.0	-0.6
V2XM	00	Z	100	7	0	14.2	18.1	11.3
V2XM	12	Z	100	8	0	12.6	16.0	9.9
03953	00	Z	100	28	0	18.4	18.8	3.9
03953	12	Z	100	26	0	17.8	18.3	4.0
04018	00	Z	100	24	0	16.0	17.9	8.1
04018	12	Z	100	22	0	11.9	19.3	15.2
04220	00	Z	100	5	0	15.0	16.6	7.0
04220	12	Z	100	5	0	12.0	20.3	16.4
04270	00	Z	100	30	0	27.9	31.4	-14.5
04270	12	Z	100	25	0	16.6	18.0	-7.0
04339	00	Z	100	23	0	14.5	17.0	8.9
04339	12	Z	100	22	0	12.2	13.8	6.4
04360	00	Z	100	28	0	12.9	13.8	4.8
04360	12	Z	100	25	0	14.8	16.2	6.5
08001	00	Z	100	24	0	15.1	16.5	6.7
08001	12	Z	100	21	1	22.6	25.5	11.8
08508	00	Z	100	1	0	0.0	6.0	6.0
08508	12	Z	100	17	0	20.2	20.7	4.8
08594	12	Z	100	17	0	13.8	15.0	5.9
60020	12	Z	100	3	0	16.2	17.2	-5.7
71600	00	Z	100	29	0	17.0	18.4	7.0
71600	12	Z	100	27	0	17.6	18.7	-6.1
72201	00	Z	100	28	0	13.1	14.4	6.0
72201	12	Z	100	27	0	26.9	27.8	-7.0
72402	00	Z	100	26	0	17.9	23.8	15.6
72402	12	Z	100	24	0	18.4	19.7	6.9
74494	00	Z	100	29	0	12.4	13.4	5.1
74494	12	Z	100	26	0	15.9	18.3	-9.1
78016	00	Z	100	2	0	2.0	22.1	22.0
78016	12	Z	100	26	0	16.9	21.2	12.8

TABLE 11

**MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: December 1998**

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from Bracknell global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	12	Z	500	10	0	11.6	23.8	20.8
DBLK	00	Z	500	1	0	0.0	20.0	20.0
DBLK	12	Z	500	8	0	10.2	25.4	23.3
ELML5	00	Z	500	1	0	0.0	4.0	4.0
ELML7	00	Z	500	18	0	12.7	17.1	11.4
ELML7	12	Z	500	16	0	17.9	24.9	17.3
FNOR	00	Z	500	11	0	8.7	18.6	16.5
FNOR	12	Z	500	10	0	8.9	16.5	13.9
FNOU	00	Z	500	10	0	9.4	14.0	10.4
FNOU	12	Z	500	8	0	13.3	26.2	22.6
FNPH	00	Z	500	10	0	16.2	22.1	15.1
FNPH	12	Z	500	10	0	27.7	37.7	25.6
FNRS	00	Z	500	13	1	10.5	15.6	11.5
FNRS	12	Z	500	12	0	21.0	25.9	15.2
JDWX	00	Z	500	1	0	0.0	8.0	-8.0
LDWR	00	Z	500	23	1	16.6	17.2	4.4
LDWR	12	Z	500	23	0	16.6	16.7	-0.7
LDWR/7200		Z	500	1	0	0.0	9.0	9.0
OVYA2	00	Z	500	13	0	13.1	16.9	-10.7
OVYA2	12	Z	500	10	0	12.4	18.5	-13.7
OXYH2	00	Z	500	10	0	13.7	14.7	-5.5
OXYH2	12	Z	500	11	0	26.3	26.6	3.5
V2XM	00	Z	500	8	0	17.8	17.9	1.6
V2XM	12	Z	500	8	0	15.5	16.4	-5.4
03953	00	Z	500	30	0	16.3	18.6	9.0
03953	12	Z	500	27	0	14.5	17.9	10.5
04018	00	Z	500	28	0	14.3	15.1	4.8
04018	12	Z	500	26	0	13.5	17.6	11.3
04220	00	Z	500	29	0	11.9	12.6	4.2
04220	12	Z	500	27	0	12.5	12.7	2.3
04270	00	Z	500	30	0	23.5	23.5	0.6
04270	12	Z	500	25	0	18.0	18.5	4.2
04339	00	Z	500	28	0	15.1	16.6	6.9
04339	12	Z	500	26	0	19.0	19.3	3.4
04360	00	Z	500	30	0	12.8	12.8	0.1
04360	12	Z	500	25	0	13.8	14.0	2.5
08001	00	Z	500	30	0	10.3	16.2	12.5
08001	12	Z	500	26	0	19.3	23.9	14.1
08508	00	Z	500	1	0	0.0	22.0	22.0
08508	12	Z	500	24	0	22.4	26.4	13.9
08594	12	Z	500	21	0	7.1	10.6	7.9
60020	00	Z	500	29	0	8.7	19.3	17.3
60020	12	Z	500	27	0	9.3	24.9	23.1
71600	00	Z	500	29	0	16.9	17.7	5.3
71600	12	Z	500	27	0	13.9	13.9	-0.1
72201	00	Z	500	30	0	6.4	10.3	8.1
72201	12	Z	500	27	0	8.7	8.8	1.4
72402	00	Z	500	29	0	11.2	11.8	3.7
72402	12	Z	500	27	0	15.1	16.1	-5.7
74494	00	Z	500	30	0	14.0	14.9	5.0
74494	12	Z	500	27	0	11.2	11.3	-1.4
78016	00	Z	500	2	0	9.5	21.7	19.5
78016	12	Z	500	26	0	11.0	16.1	11.8

TABLE 12

**MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: December 1998**

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from Bracknell global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	12	V	100	8	0	0	0.0	0.3	-2.3
DBLK	00	V	100	1	0	0	0.0	-1.0	3.6
DBLK	12	V	100	8	0	0	0.0	-4.7	-2.7
ELML5	00	V	100	1	0	0	5.4	2.3	-1.0
ELML7	00	V	100	16	0	0	5.4	-0.2	1.4
ELML7	12	V	100	14	0	0	3.0	-1.0	-0.7
FNOR	00	V	100	11	0	0	3.7	0.3	-0.7
FNOR	12	V	100	8	0	0	2.4	0.1	2.1
FNOU	00	V	100	8	0	0	2.4	0.6	-1.1
FNOU	12	V	100	5	0	0	2.4	-0.5	-2.8
FNPH	00	V	100	8	0	0	2.4	-1.6	-0.9
FNPH	12	V	100	10	0	0	2.4	-1.9	0.1
FNRS	00	V	100	11	0	0	3.7	-0.5	1.9
FNRS	12	V	100	10	0	0	2.2	-0.3	1.4
JDWX	00	V	100	1	0	0	3.9	-1.3	3.7
LDWR	00	V	100	23	0	0	3.9	0.6	-1.0
LDWR	12	V	100	22	0	0	4.7	0.5	-0.8
OVYA2	00	V	100	12	0	0	2.0	-0.5	0.0
OVYA2	12	V	100	8	0	0	2.1	1.0	1.9
OXYH2	00	V	100	8	0	0	2.1	-0.3	2.9
OXYH2	12	V	100	7	0	0	2.1	-1.6	-2.0
V2XM	00	V	100	7	0	0	2.1	-1.0	1.7
V2XM	12	V	100	8	0	0	2.1	0.1	0.9
03953	00	V	100	28	0	0	4.4	-0.7	0.1
03953	12	V	100	26	0	3	4.1	-1.0	0.2
04018	00	V	100	21	0	0	3.6	0.7	-0.4
04018	12	V	100	17	0	0	2.8	0.0	0.2
04220	00	V	100	5	0	0	3.1	1.3	0.8
04220	12	V	100	2	0	0	3.1	0.0	-3.2
04270	00	V	100	26	0	0	3.1	0.6	0.8
04270	12	V	100	24	0	0	2.9	0.3	1.2
04339	00	V	100	18	0	0	4.6	-0.4	0.7
04339	12	V	100	22	0	4	4.2	3.2	-0.9
04360	00	V	100	24	0	4	4.2	0.0	2.0
04360	12	V	100	24	0	4	4.8	-0.2	0.4
08001	00	V	100	24	0	4	4.9	0.1	1.9
08001	12	V	100	17	0	0	4.2	-1.6	-0.2
08508	00	V	100	1	0	0	3.5	-3.7	-4.0
08508	12	V	100	11	0	0	3.5	0.3	-1.1
08594	00	V	100	1	0	0	3.7	3.5	14.3
08594	12	V	100	16	0	0	3.7	-1.8	3.2
71600	00	V	100	21	0	0	4.0	1.4	-0.3
71600	12	V	100	23	0	0	3.9	1.0	0.9
72201	00	V	100	27	0	0	3.6	-0.1	0.8
72201	12	V	100	27	0	0	3.0	-0.2	-0.2
72402	00	V	100	25	0	0	3.2	0.1	0.6
72402	12	V	100	23	0	0	4.2	-0.3	-0.5
74494	00	V	100	25	0	0	6.0	-2.2	1.8
74494	12	V	100	22	0	0	4.2	-2.9	0.5
78016	00	V	100	1	0	0	3.7	7.4	-5.4
78016	12	V	100	26	0	0	3.7	-1.0	0.8

TABLE 13

**MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: December 1998**

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from Bracknell global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	12	V	500	7	0	0	0.0	-0.4	-0.6
DBLK	00	V	500	1	0	0	0.0	4.9	0.4
DBLK	12	V	500	8	0	0	0.0	-0.4	-1.7
ELML5	00	V	500	1	0	0	2.5	-4.6	6.9
ELML7	00	V	500	15	0	0	2.5	0.0	0.0
ELML7	12	V	500	13	0	0	4.0	-1.3	-2.0
FNOR	00	V	500	11	0	0	5.5	-1.8	-1.3
FNOR	12	V	500	10	0	0	2.5	0.2	-0.5
FNOU	00	V	500	9	0	0	1.7	1.0	-2.4
FNOU	12	V	500	8	0	0	1.7	1.3	1.6
FNPH	00	V	500	9	0	0	1.7	0.0	0.7
FNPH	12	V	500	8	0	0	1.7	0.3	-1.1
FNRS	00	V	500	11	0	0	1.7	-1.2	-1.3
FNRS	12	V	500	10	0	10	2.5	-1.5	2.7
JDWX	00	V	500	1	0	0	7.0	2.4	0.3
LDWR	00	V	500	24	0	4	7.0	1.0	1.5
LDWR	12	V	500	23	0	0	5.4	0.1	0.6
LDWR/7200	00	V	500	1	0	0	4.3	3.6	-0.5
OVYA2	00	V	500	13	0	0	4.3	-0.5	1.7
OVYA2	12	V	500	9	0	0	3.8	-1.6	0.2
OXYH2	00	V	500	10	0	0	3.8	2.1	1.4
OXYH2	12	V	500	8	0	12	5.7	3.7	-1.7
V2XM	00	V	500	8	0	0	5.7	0.1	0.6
V2XM	12	V	500	8	0	0	5.7	-1.7	0.4
03953	00	V	500	30	0	0	4.7	0.0	-0.8
03953	12	V	500	27	0	3	4.9	1.8	2.3
04018	00	V	500	26	0	3	5.8	-0.6	0.1
04018	12	V	500	21	0	4	4.3	-2.1	-2.2
04220	00	V	500	27	0	7	4.6	1.7	0.3
04220	12	V	500	26	0	0	5.5	0.4	2.0
04270	00	V	500	28	0	0	4.9	-1.0	-0.9
04270	12	V	500	24	0	4	4.6	0.6	-1.1
04339	00	V	500	22	0	4	5.3	1.3	-1.1
04339	12	V	500	26	0	11	4.4	3.2	-2.2
04360	00	V	500	26	0	0	6.1	-2.5	-0.5
04360	12	V	500	15	0	0	5.0	-1.2	3.2
08001	00	V	500	30	0	0	3.9	-0.4	-1.9
08001	12	V	500	24	0	0	4.0	0.1	-2.2
08508	00	V	500	1	0	0	3.0	-4.7	-1.1
08508	12	V	500	21	0	0	3.0	1.3	-0.3
08594	00	V	500	1	0	0	3.3	-4.0	1.3
08594	12	V	500	21	0	0	3.3	-1.7	0.4
60020	00	V	500	29	0	0	2.7	-1.1	0.3
60020	12	V	500	22	0	0	2.8	-0.8	0.3
71600	00	V	500	28	0	0	3.9	0.8	-0.1
71600	12	V	500	27	0	0	4.1	1.9	1.9
72201	00	V	500	29	0	0	3.3	-0.5	-1.2
72201	12	V	500	27	0	0	2.6	0.0	-1.2
72402	00	V	500	29	0	0	2.2	0.6	0.6
72402	12	V	500	26	0	0	2.6	1.1	1.4
74494	00	V	500	30	0	0	2.4	-0.7	2.0
74494	12	V	500	27	0	0	3.9	-1.0	0.4
78016	00	V	500	2	0	0	2.9	-3.5	2.1
78016	12	V	500	26	0	0	2.9	0.1	1.1

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s ⁻¹
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45